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Department
of transportation

National Highway
Traffic Safety
Administration

DOT HS 808 216

August 1993

Final Report

Reducing Heavy Truck Aggressiveness Moving Heavy Truck Into a 1993 Honda Civic 3-Door Hatchback at 80.1 KPH

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1042
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Technical Report Documentation Page

1. Report No. DOT HS 808 216		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle REDUCING HEAVY TRUCK AGGRESSIVENESS MOVING HEAVY TRUCK INTO A 1993 HONDA CIVIC 3-DOOR HATCHBACK AT 80.1 KPH				5. Report Date AUGUST 1993	
				6. Performing Organization Code	
7. Author(s) S. A. Johnston, Project Engineer, TRC				8. Performing Organization Report No. 930810	
9. Performing Organization Name and Address National Highway Traffic Safety Admin. Vehicle Research and Test Center P. O. BOX 37 East Liberty, OH 43319				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTNH22-88-C-07292	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh St., S.W. Washington, DC 20590				13. Type of Report and Period Covered FINAL REPORT AUG. - SEPT. 1993	
				14. Sponsoring agency Code DOT/NHTSA/VRTC	
15. Supplemental Notes					
16. Abstract This test report documents a crash test that was conducted for research and development in support of reducing heavy truck aggressiveness. This test was conducted with a 1993 Honda Civic 3-door hatchback, VIN 2HGEH2359PH526698, at Transportation Research Center Inc. on August 10, 1993. The test vehicle was impacted on the left front of the vehicle by the heavy truck. The struck vehicle contained ten (10) accelerometers and one (1) instrumented Hybrid III driver dummy.					
17. Key Words Heavy Truck Aggressiveness Occupant Response JUL 01 1998 NASSIF BRANC				18. Distribution Statement Document is available to the U.S. public through the National Technical Information Service, Springfield, VA 22161	
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 160	
22. Price					

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

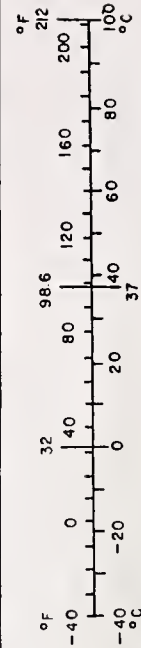
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
----	---------------------	-------------------	------------------------	----



* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

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SECTION 1.0

PURPOSE AND TEST SUMMARY

This test was conducted as research in support of reducing heavy truck aggressiveness. This test was conducted on August 10, 1993.

The stationary vehicle, a 1993 Honda Civic 3-door hatchback, was equipped with a 1.5-liter, 4-cylinder, transverse gasoline engine and a 5-speed manual transmission. The test weight of the vehicle was 1122 kg. The vehicle was instrumented with eight (8) longitudinal axis accelerometers, one (1) lateral axis accelerometer, one (1) vertical axis accelerometer and two (2) seat belt force load cells. One (1) Part 572E dummy was seated in the left front outboard seating position according to the dummy placement procedure specified in Appendix B and Optional Appendix C of Laboratory Procedure TP-208-08. The dummy was instrumented in the head, chest, and pelvis with longitudinal, lateral, and vertical accelerometers. The dummy was also instrumented with a 6-axis neck load cell, two (2) femur load cells, and a chest deflection potentiometer.

The stationary vehicle was impacted in the left front at 340 degrees by a moving heavy truck at 80.1 kph. The intended impact engagement was the left front of the car with the right front of the truck.

The moving heavy truck's test weight was 11,218 kg. The truck was equipped with a lowered flat rigid bumper. The truck was instrumented with two (2) longitudinal and lateral axis accelerometers and one (1) vertical axis accelerometer.

The dummy's head injury criterion, HIC, was 1437. The dummy's chest deceleration with 3 milliseconds minimum duration was 72.8 g. The dummy's maximum left femur force was 3521 N. The dummy's maximum right femur force was 7843 N.

The vehicle, dummy, and heavy truck data were multiplexed and recorded on a 14-channel analog tape deck. The analog data was digitally sampled at 8000 samples per second. The data was digitally filtered as per SAE J211 OCT88.

The test was filmed by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras operating at approximately 500 frames per second.

Section 2.0 contains the vehicle, dummy, truck, and test data. Appendix A contains the pre- and post-test still photographs. Appendix B contains the final test data plots. Appendix C contains miscellaneous test information.

SECTION 2.0

VEHICLE, DUMMY, TRUCK AND TEST DATA

DATA ACQUISITION EXPLANATIONS

The engine top X-axis accelerometer, ENGXG1, lost data at 20 milliseconds because the accelerometer cable was cut by vehicle crush. This data loss affected the engine top X-axis velocity calculation, ENGXV1.

The left brake caliper X-axis accelerometer, BCLXG1, lost data at 22 milliseconds because the accelerometer cable was cut by vehicle crush. This data loss affected the left brake caliper X-axis velocity calculation, BCLXV1.

The right brake caliper X-axis accelerometer, BCRXG1, lost data at 103 milliseconds because the accelerometer cable was cut by vehicle crush. This data loss affected the right brake caliper X-axis velocity calculation, BCRXV1.

The instrument panel center X-axis accelerometer, DPCXG1, lost data at 29 milliseconds because the accelerometer cable was cut by vehicle crush. This data loss affected the instrument panel center X-axis velocity calculation, DPCXV1.

TABLE 1 CRASH TEST SUMMARY

TEST TYPE: Heavy Truck into Stationary Vehicle

TEST DATE: 08/10/93 TEST TIME: 1450 AMBIENT TEMP. (°C): 19

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Honda/Civic/3-door hatchback

VEHICLE TEST WEIGHT (KG): 1122

IMPACT ANGLE (DEG)*: 340

IMPACT VELOCITY (KPH)**: PRIMARY = 80.1 SECONDARY = 80.1

MAXIMUM STATIC CRUSH (MM): 933

DUMMY: Driver #048

TYPE: Part 572E

LOCATION: Left front

RESTRAINT: 3-point unbelt
and airbag

NUMBER OF DATA CHANNELS: 35

NUMBER OF CAMERAS: HIGH-SPEED 5 REAL-TIME 1

*With respect to tow track centerline.

**Speed trap measurement (\pm .08 kph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Honda of Canada, Mfg.

MAKE/MODEL: Honda/Civic

VIN: 2HGEH2359PH526698

BODY STYLE: 3-door hatchback

MODEL YEAR: 1993

COLOR: Red

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1.5 liters

TRANSMISSION DATA: 5 SPEED, X MANUAL, ___ AUTOMATIC, X FWD, ___ RWD, ___ 4WD

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 167

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	Yes
OTHER	None		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Honda of Canada, Mfg.

DATE OF MANUFACTURE: 03/93

VIN: 2HGEH2359PH526698

GVWR: 3055 LBS

GAWR: FRONT: 1610 LBS., REAR: 1500 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D.

TIRES ON VEHICLE (MFR., LINE, SIZE): Goodyear, Invicta GL, P165/70R13

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 44 PSI
REAR: 44 PSI

SPARE TIRE (MFR., SIZE): Goodyear, Temporary, T105/80D13

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 1702 MILLIMETERS

WHEELBASE: 2570 MILLIMETERS

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located in the glove box.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P165/70R13 78S

RECOMMENDED COLD TIRE PRESSURE: FRONT: 35 PSI; REAR: 32 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 3 REAR 5 TOTAL

VEHICLE CAPACITY WEIGHT: 850 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN MILLIMETERS):

DELIVERED ATTITUDE: LF 656; RF 662; LR 644; RR 645

PRE-TEST ATTITUDE: LF 640; RF 655; LR 590; RR 609

POST-TEST ATTITUDE: LF 762; RF 656; LR 566; RR 671

TABLE 2 TEST VEHICLE INFORMATION CONT'D.

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	287 KG	RIGHT REAR	178 KG
LEFT FRONT	293 KG	LEFT REAR	187 KG
TOTAL FRONT WEIGHT	580 KG	(61.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	365 KG	(38.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT	945 KG		
TARGET TEST WEIGHT	1122 KG ¹		

WEIGHT OF TEST VEHICLE:

RIGHT FRONT	303 KG	RIGHT REAR	243 KG
LEFT FRONT	321 KG	LEFT REAR	255 KG
TOTAL FRONT WEIGHT	624 KG	(56.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	498 KG	(43.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	1122 KG		

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: None

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 1140 MILLIMETERS REARWARD OF FRONT WHEEL CENTERLINE

¹The target test weight was established during Test 920825.

TABLE 3 TRUCK INFORMATION

WEIGHT DISTRIBUTION

FRONT: 3620 KG

REAR: 7598 KG

AXLE SPACING

FRONT: 3835 MM

REAR: 1308 MM

DISTANCE OF C.G. BEHIND FRONT AXLE: 3040 MM

BUMPER DESCRIPTION: Lowered flat rigid bumper.

TRUCK DAMAGE: There was no damage to the truck.

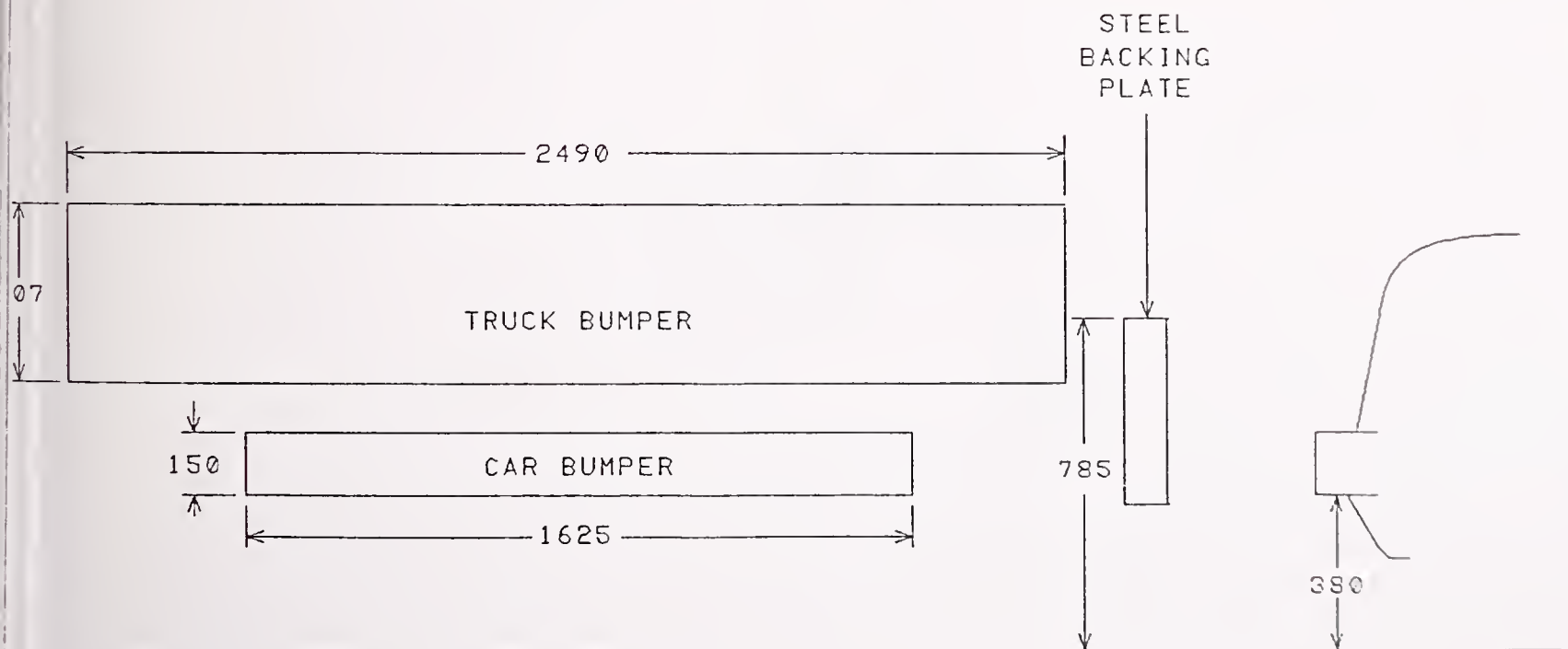


TABLE 4 POST-IMPACT DATA

TEST NUMBER: 930810

TEST DATE: 08/10/93

TEST TIME: 1450

TEST TYPE: Heavy Truck into Stationary Vehicle

IMPACT ANGLE: 340

AMBIENT TEMPERATURE AT IMPACT AREA: 19° C

TEMPERATURE IN OCCUPANT COMPARTMENT: 19° C

IMPACT VELOCITY: PRIMARY = 80.1 KPH

SECONDARY = 80.1 KPH

(SPECIFIED RANGE = 79.7 TO 81.3 KPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 381 MM

EXITING VELOCITY TRAP = 51 MM

TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN MILLIMETERS):

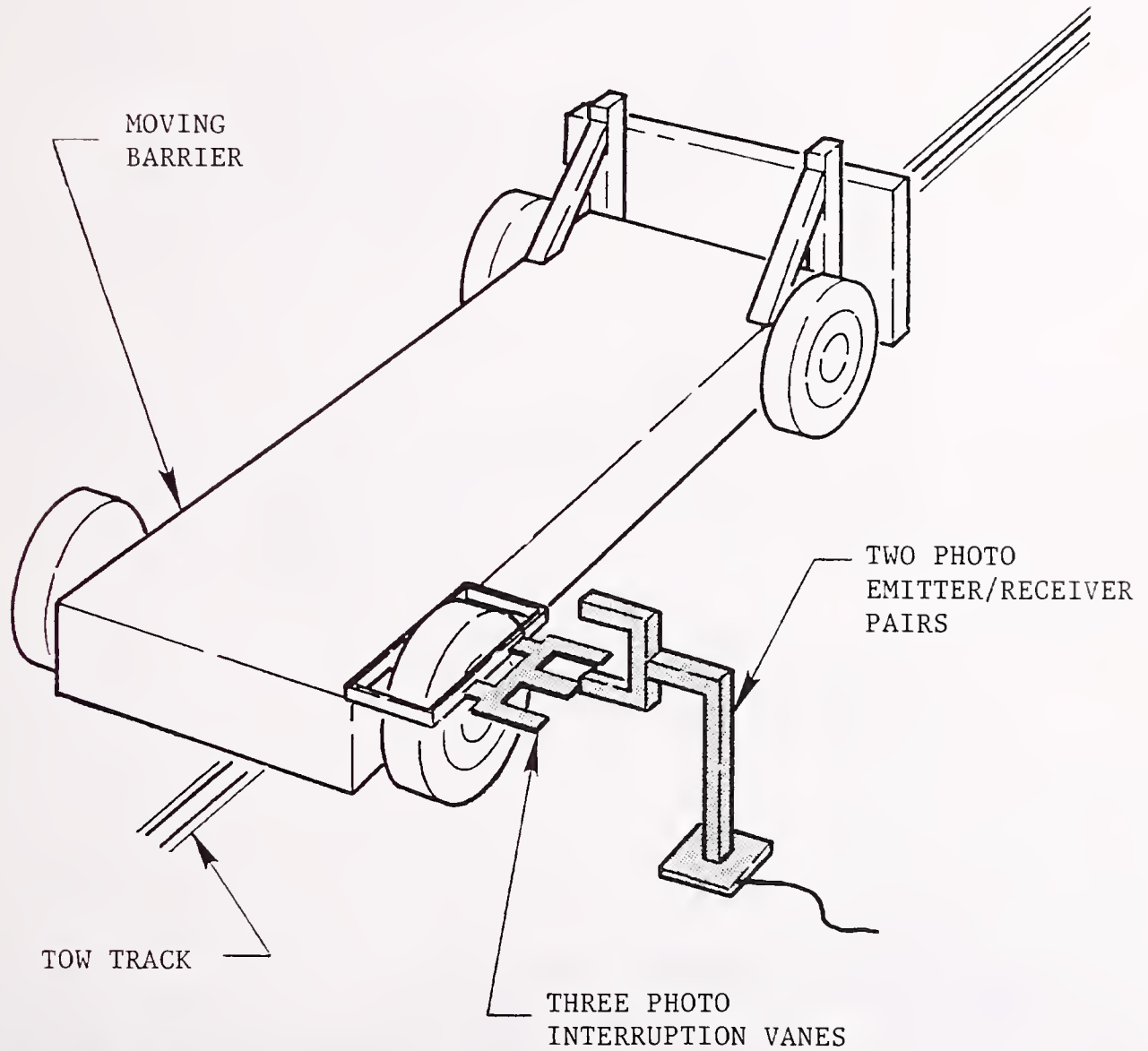
OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 3905; C 4085; R 3910

POST-TEST: L 2972; C 3375; R 3751

TOTAL CRUSH: L 933; C 710; R 159

AVERAGE CRUSH: 601

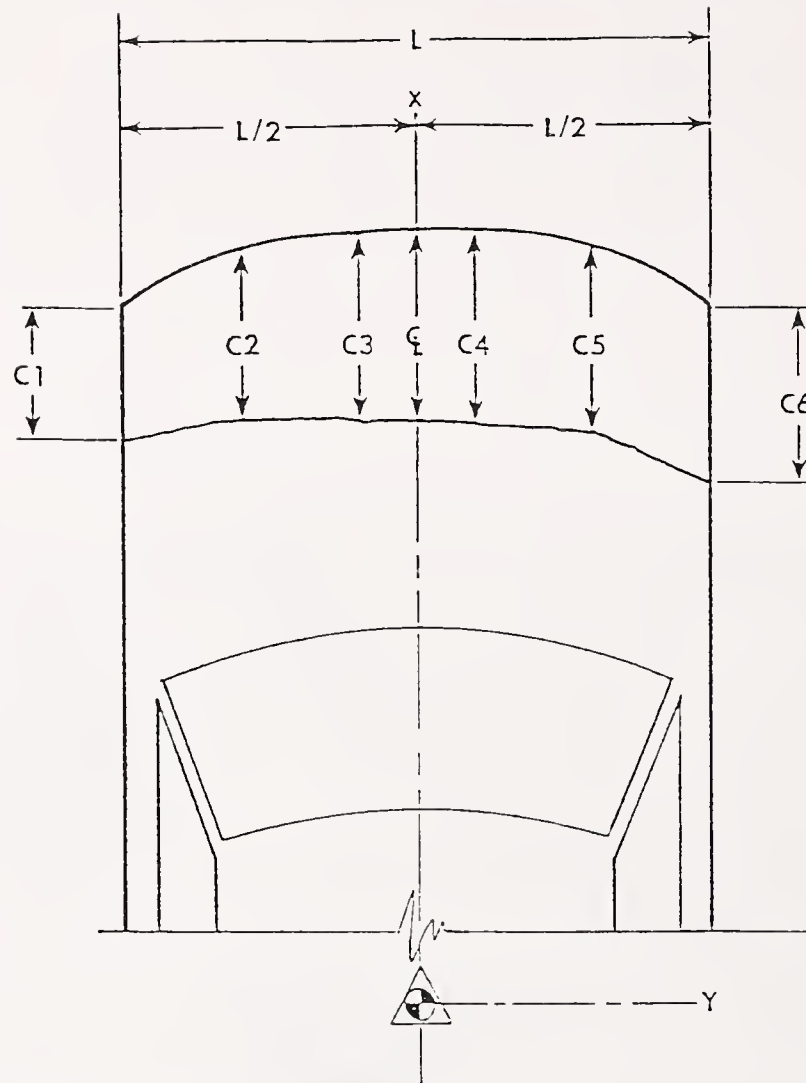
FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver 51 millimeters before impact.

The vanes have 305-millimeter spacing.

FIGURE 2 VEHICLE CRUSH



NOTES: L is pre-test length of contact surface.
 $C1$ through $C6$ are spaced equally apart.
 CL is vehicle centerline.
 All measurements are in millimeters.

Vehicle Honda Civic

PRE-TEST		POST-TEST		CRUSH	
L	<u>1396</u>				
$C1$	<u>3905</u>	$C1$	<u>2972</u>	$C1$	<u>933</u>
$C2$	<u>4020</u>	$C2$	<u>3154</u>	$C2$	<u>866</u>
$C3$	<u>4080</u>	$C3$	<u>3310</u>	$C3$	<u>770</u>
$C4$	<u>4081</u>	$C4$	<u>3436</u>	$C4$	<u>645</u>
$C5$	<u>4030</u>	$C5$	<u>3551</u>	$C5$	<u>479</u>
$C6$	<u>3910</u>	$C6$	<u>3751</u>	$C6$	<u>159</u>
CL	<u>4085</u>	CL	<u>3375</u>	CL	<u>710</u>

FIGURE 3 PRE-TEST AND POST-TEST MEASUREMENT POINTS

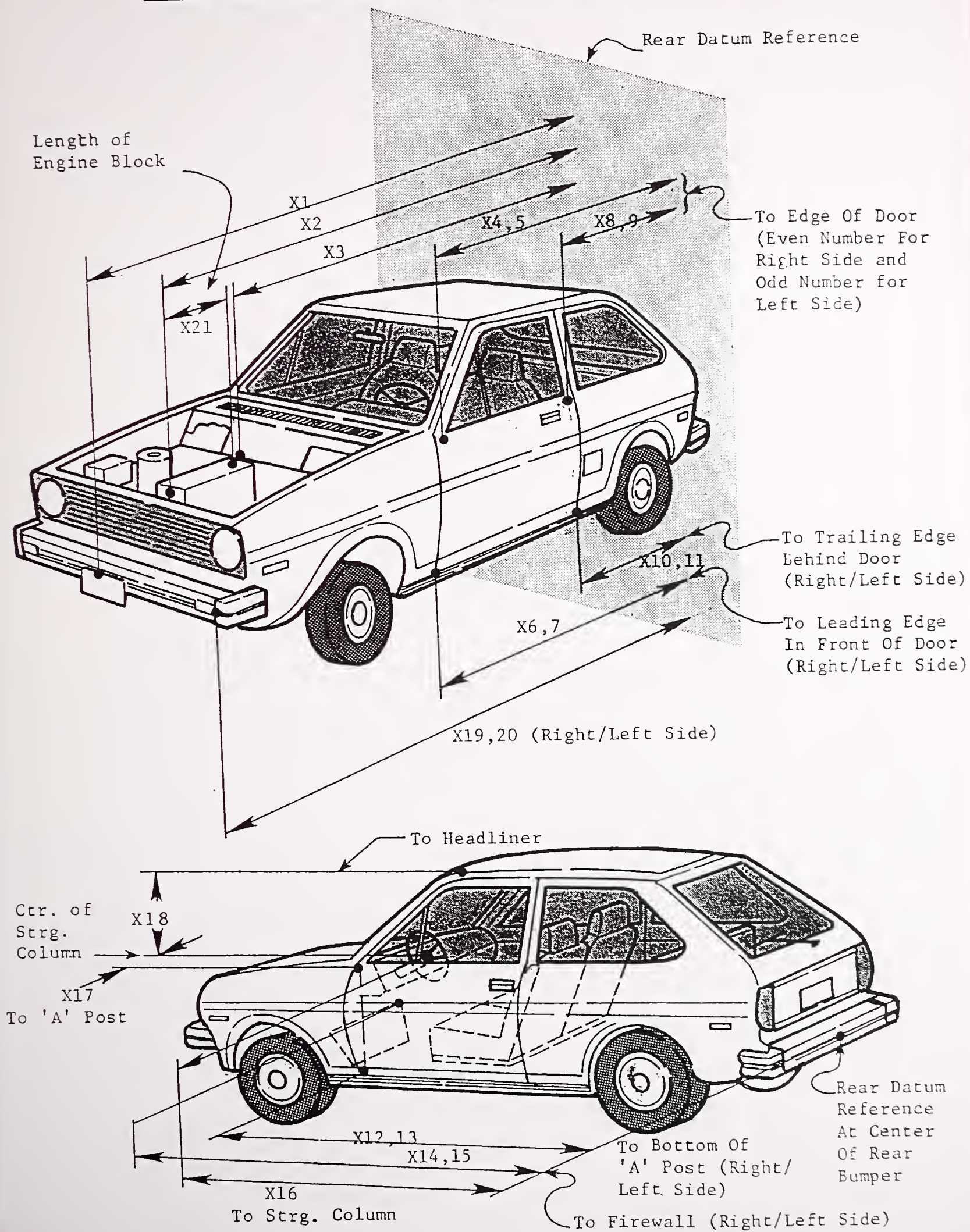
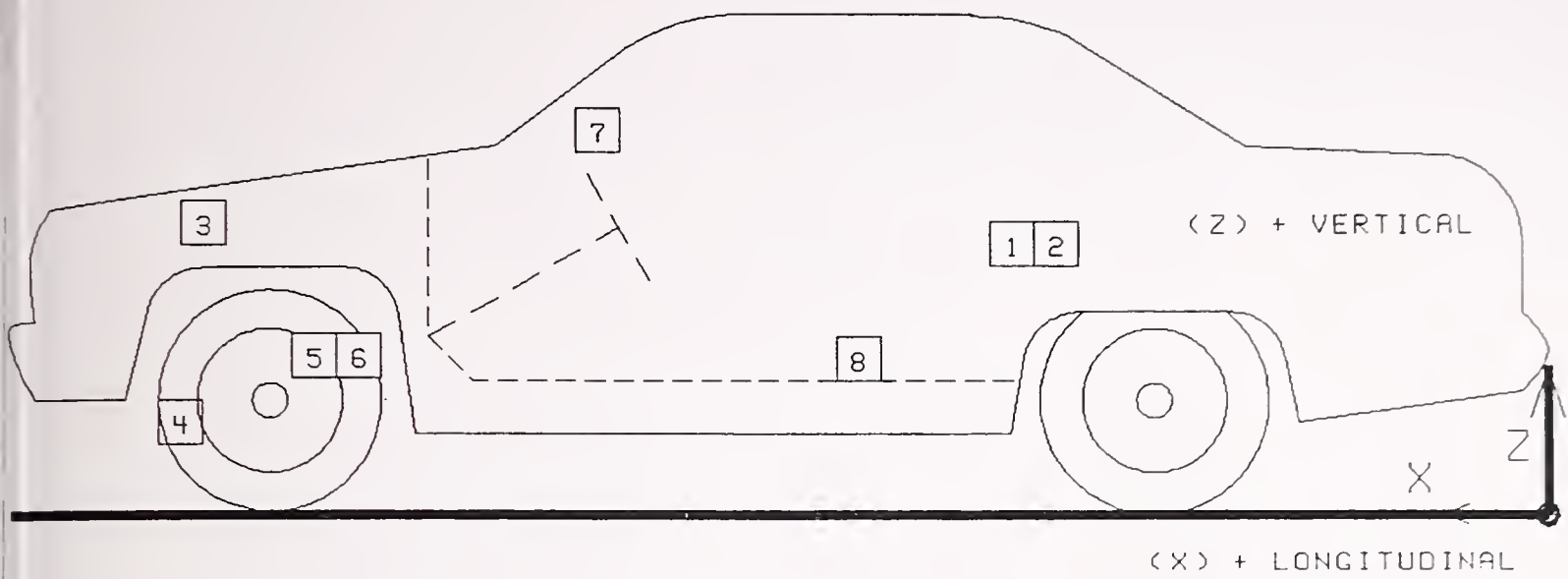


TABLE 5 IMPACTED VEHICLE MEASUREMENTS

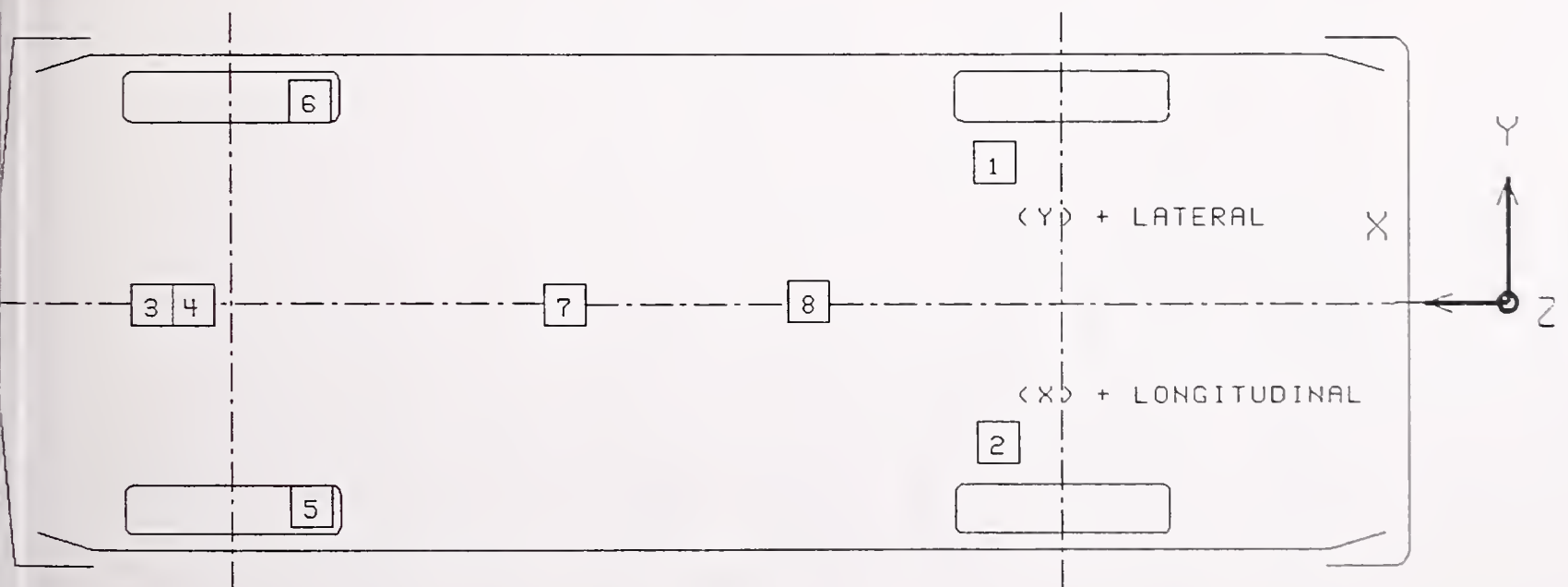
VEHICLE MAKE/MODEL: <u>Honda/Civic</u>		TEST NUMBER: <u>930810</u>		
NO.	TYPE OF MEASUREMENT	PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	4085	3375	710
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	3593	3106	487
X3	REAR SURFACE OF VEHICLE TO FIREWALL	3045	2783	262
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	2743	2752	-9
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	2735	2375	360
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	2750	2739	11
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	2740	2383	357
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	1470	1484	-14
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	1460	1497	-37
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	1540	1524	16
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	1525	1495	30
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	2735	2735	0
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	2730	2316	414
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	2965	2871	94
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	2960	2671	289
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	2258	1974	284
X17	CENTER OF STEERING COLUMN TO "A" POST	260	321	-61
X18	CENTER OF STEERING COLUMN TO HEADLINER	430	565	-135
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	3910	3751	159
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	3905	2972	933
X21	LENGTH OF ENGINE BLOCK	410	410	0

All distance measurements are in millimeters.

FIGURE 4 VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 6

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930810

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION		DIRECTION	
				MAX G	MSEC	MAX G	MSEC
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	1302	520	330	1.8	158.6	33.1	45.5
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	1302	-543	342	3.1	134.4	42.0	27.5
3 ENGINE TOP LONGITUDINAL ¹	3510	25	749	---	---	---	---
4 ENGINE BOTTOM LONGITUDINAL	3457	240	184	22.5	28.0	232.8	18.8
5 RIGHT BRAKE CALIPER LONGITUDINAL ¹	3370	-652	261	---	---	---	---
6 LEFT BRAKE CALIPER LONGITUDINAL ¹	3370	652	254	---	---	---	---

TABLE 6

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY CONTINUED

TEST NUMBER 930810

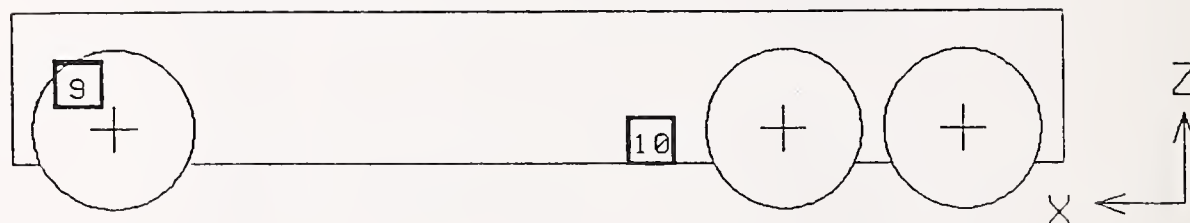
No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION	MAX G MSEC	DIRECTION	MAX G MSEC
7 INSTRUMENT PANEL CENTER LONGITUDINAL ¹	2615	0	885	---	---	---	---
8 CENTER OF GRAVITY	1855	0	292	1.6	258.6	64.2	44.6
LONGITUDINAL				6.1	37.5	30.2	26.0
LATERAL				14.9	42.8	27.8	28.8
VERTICAL				66.4	44.4		
RESULTANT							

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

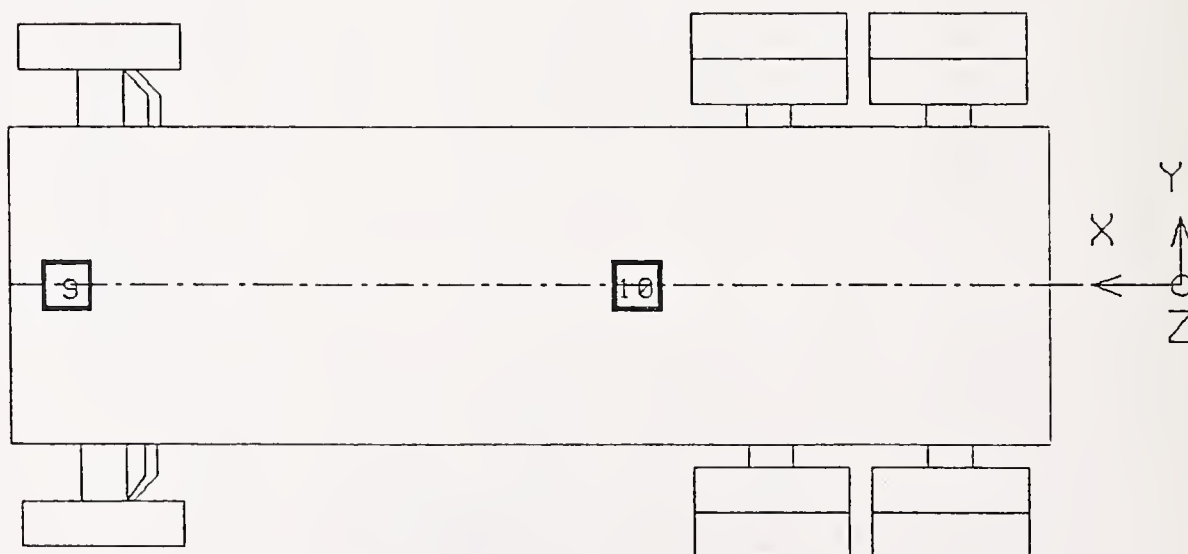
REFERENCE: X: + FORWARD FROM REAR BUMPER
 Y: + LEFTWARD FROM VEHICLE CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

¹See DATA ACQUISITION EXPLANATIONS

FIGURE 5 TRUCK ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 7

HEAVY TRUCK ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 930810

No. LOCATION	X*	Y*	Z*	POSITIVE		NEGATIVE	
				DIRECTION	MAX G MSEC	DIRECTION	MAX G MSEC
9 FRONT FRAME	6160	0	658				
CROSSMEMBER							
LONGITUDINAL				7.9	8.1	15.6	37.6
LATERAL				15.2	47.9	18.1	29.9
VERTICAL				21.7	34.1	12.2	28.4
RESULTANT				21.9	34.1		
10 CENTER OF GRAVITY	2527	0	1050				
LONGITUDINAL				4.6	12.0	11.3	20.5
LATERAL				3.8	70.9	2.6	37.8

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN MILLIMETERS.

REFERENCE: X: + FORWARD FROM TRAILING EDGE OF TRUCK
Y: + LEFT FROM TRUCK CENTERLINE
Z: + UP FROM GROUND LEVEL

TABLE 8

DUMMY DATA SUMMARY

TEST NUMBER 930810

DRIVER DUMMY

SN: 048

POSITIVE DIRECTION MAX	NEGATIVE DIRECTION MAX	MSEC	MSEC
------------------------------	------------------------------	------	------

HEAD ACCELERATION (g)

LONGITUDINAL	65.9	108.1	130.1	63.8
LATERAL	41.2	66.3	29.6	101.6
VERTICAL	22.0	66.4	39.3	49.0
RESULTANT	134.9	63.8		
HIC	1437	FROM 52.5 TO 75.9		

NECK FORCE (N)

LONGITUDINAL	1450.1	63.1	641.5	101.8
LATERAL	554.9	58.1	90.4	227.3
VERTICAL	3467.8	62.4	775.2	90.4
RESULTANT	3704.6	62.4		

NECK MOMENT (N-M)

ABOUT X	31.9	69.9	38.4	103.5
ABOUT Y	70.9	99.0	119.5	64.0
ABOUT Z	24.3	65.0	14.4	142.1
RESULTANT	122.4	64.0		

TABLE 8

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 930810

DRIVER DUMMY
SN: 048

POSITIVE	NEGATIVE
DIRECTION	DIRECTION
MAX	MAX
MSEC	MSEC

CHEST ACCELERATION (g)			
LONGITUDINAL	20.4	89.4	85.1 60.0
LATERAL	7.7	40.1	34.1 84.1
VERTICAL	22.2	81.8	24.5 65.9
RESULTANT	86.3	60.0	
3 MSEC	72.8		

CHEST DEFLECTION (mm)			
LONGITUDINAL	37.8	59.0	0.3 11.9

PELVIS ACCELERATION (g)			
LONGITUDINAL	17.9	103.1	73.8 33.6
LATERAL	38.9	32.9	42.7 73.4
VERTICAL	38.8	36.6	50.0 33.9
RESULTANT	85.4	33.9	

FEMUR LOAD (N)			
LEFT	1227.5	37.8	3521.4 50.1
RIGHT	2784.2	57.4	7843.2 35.9

POSITIVE DIRECTION		NEGATIVE DIRECTION	
LONGITUDINAL:	FORWARD	LONGITUDINAL:	REARWARD
LATERAL:	LEFTWARD	LATERAL:	RIGHTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD
FORCE:	TENSION	FORCE:	COMPRESSION

TABLE 9 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #048	PASSENGER # NA
HEAD	<u>Airbag</u>	<u></u>
CHEST	<u>Airbag</u>	<u></u>
ABDOMEN	<u>None</u>	<u></u>
LEFT KNEE	<u>Instrument panel</u>	<u></u>
RIGHT KNEE	<u>Instrument panel</u>	<u></u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Tools required</u>	<u>Opened easily</u>
REAR	<u>NA</u>	<u>NA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

The entire windshield cracked on impact.

The driver's side door glass broke on impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

The dummy translated forward and to the left at impact. The airbag inflated and reacted against the dummy's head and upper torso. The dummy's hands and knees impacted the instrument panel and inner door panel. The dummy came to rest in the driver's seat leaning against the driver's side door restrained by the 3-point unbelt.

FIGURE 6 DUMMY AND SEAT POSITIONING DATA

PRE-IMPACT DATA:

MAKE/MODEL/BODY STYLE: Honda/Civic/3-door hatchback
 MODEL YEAR: 1993 COLOR: Red

DATA FROM CERTIFICATION LABEL:

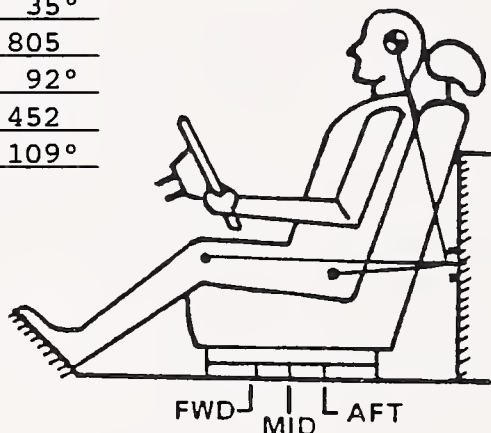
VEHICLE MANUFACTURER: Honda of Canada, Mfg.
 DATE OF MANUFACTURE: 03/93 VIN: 2HGEH2359PH526698
 GVWR: 3055 LBS.; GAWR: FRONT = 1610 LBS.; REAR = 1500 LBS.

POST-IMPACT DATA:

DATE OF TEST: 08/10/93 TIME: 1450 TEMPERATURE: 19° C
 IMPACT VELOCITY: PRIMARY = 80.1 MPH SECONDARY = 80.1 MPH
 REQUIRED IMPACT VELOCITY RANGE: 79.7 TO 81.3 MPH
 SEAT TYPE: Bucket ADJUSTER TYPE: Manual
 FRONT SEAT BACK TYPE: Manually-adjustable
 TECHNICIANS: R. Benavides, P. Cummins, R. Cribley

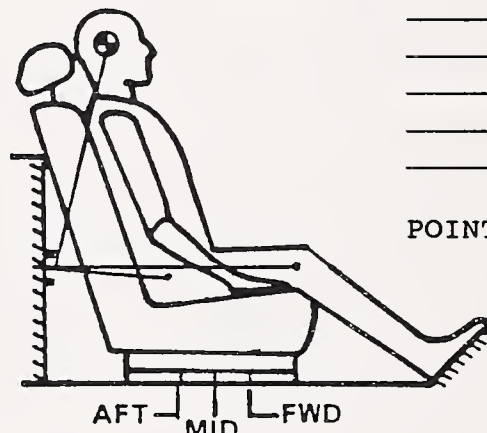
DRIVER DUMMY # 048 TYPE: IIII

HEAD 575
 TARGET 35°
 KNEE 805
 JOINT 92°
 APPROX- 452
 IMATE 109°
 "H"
 POINT



PASSENGER DUMMY # NA TYPE:

HEAD
 TARGET
 KNEE
 JOINT
 APPROX-
 IMATE
 "H"
 POINT



A = 1486

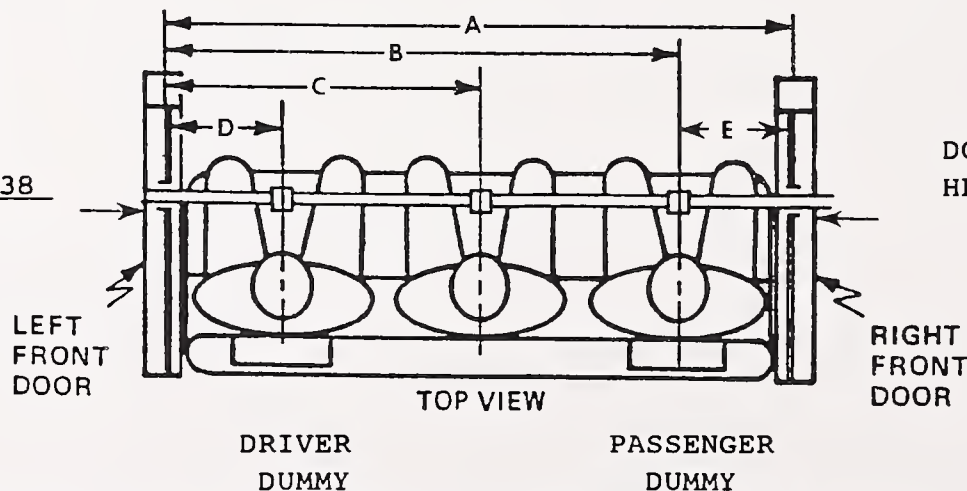
B = NA

C = NA

D = 333

E = NA

DOOR GLASS
 HEIGHT = 238



ALL ANGLES ARE RELATIVE TO VERTICAL PLANE THROUGH DOOR STRIKER.
 ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 7 DUMMY IN VEHICLE POSITIONING DATA

	DRIVER	PASSENGER
	048	NA
HH	293	
HW	533	
CD	457	
CS	296	
KDL	90	
KDR	86	
TA	22°	
SA	21°	
HSW	452	

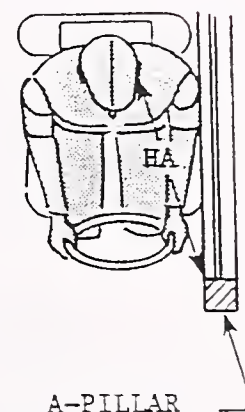
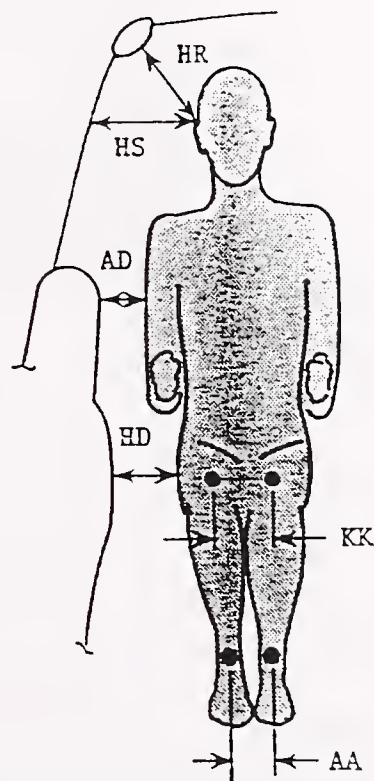
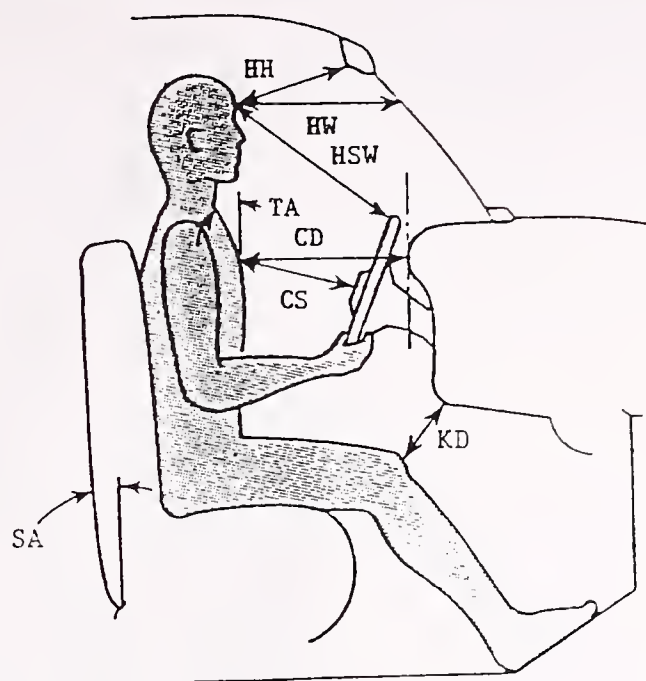
	DRIVER	PASSENGER
	048	NA
HR	162	
HS	259	
AD	91	
HD	134	
KK	210	
AA	260	
HA	530	

KNEE OUTER CLEVIS TO
OUTER CLEVIS SPACING:

DRIVER = 330

PELVIS ANGLE:

DRIVER = 24°

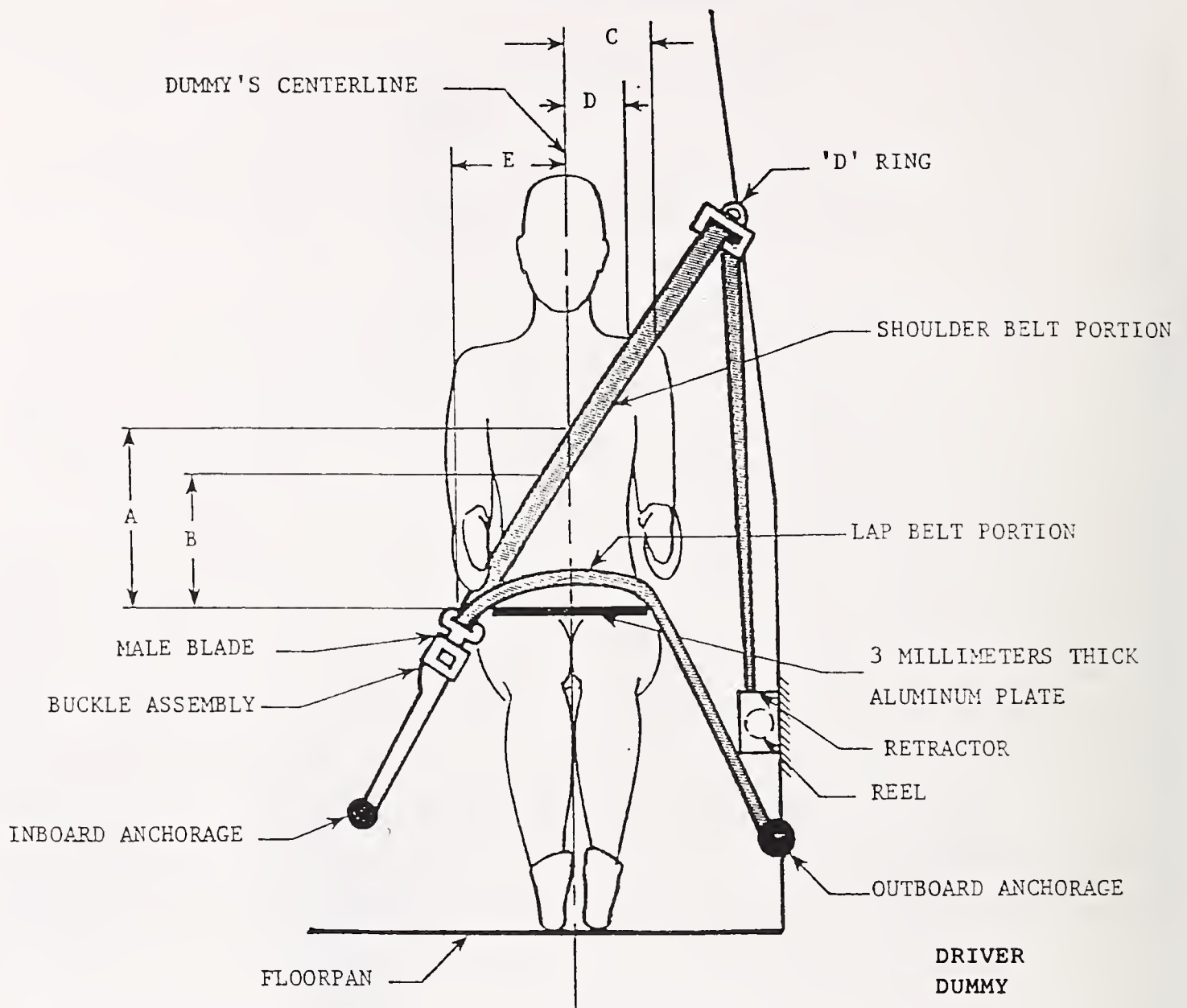


HH = HEAD TO WINDSHIELD HEADER
HW = HEAD TO WINDSHIELD
CD = CHEST TO DASH
CS = CHEST TO STEERING WHEEL
KD = KNEE TO DASH
TA = TORSO ANGLE
SA = SEAT BACK ANGLE
HSW = HEAD TO STEERING WHEEL

HR = HEAD C.G. TARGET TO SIDE ROOF HEADER
HS = HEAD C.G. TARGET TO SIDE WINDOW
AD = ARM TO DOOR
HD = HIP TO DOOR
KK = KNEE TO KNEE
AA = ANKLE TO ANKLE
HA = HEAD C.G. TARGET TO A-PILLAR

TORSO AND SEAT BACK ANGLES ARE RELATIVE TO VERTICAL.
ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

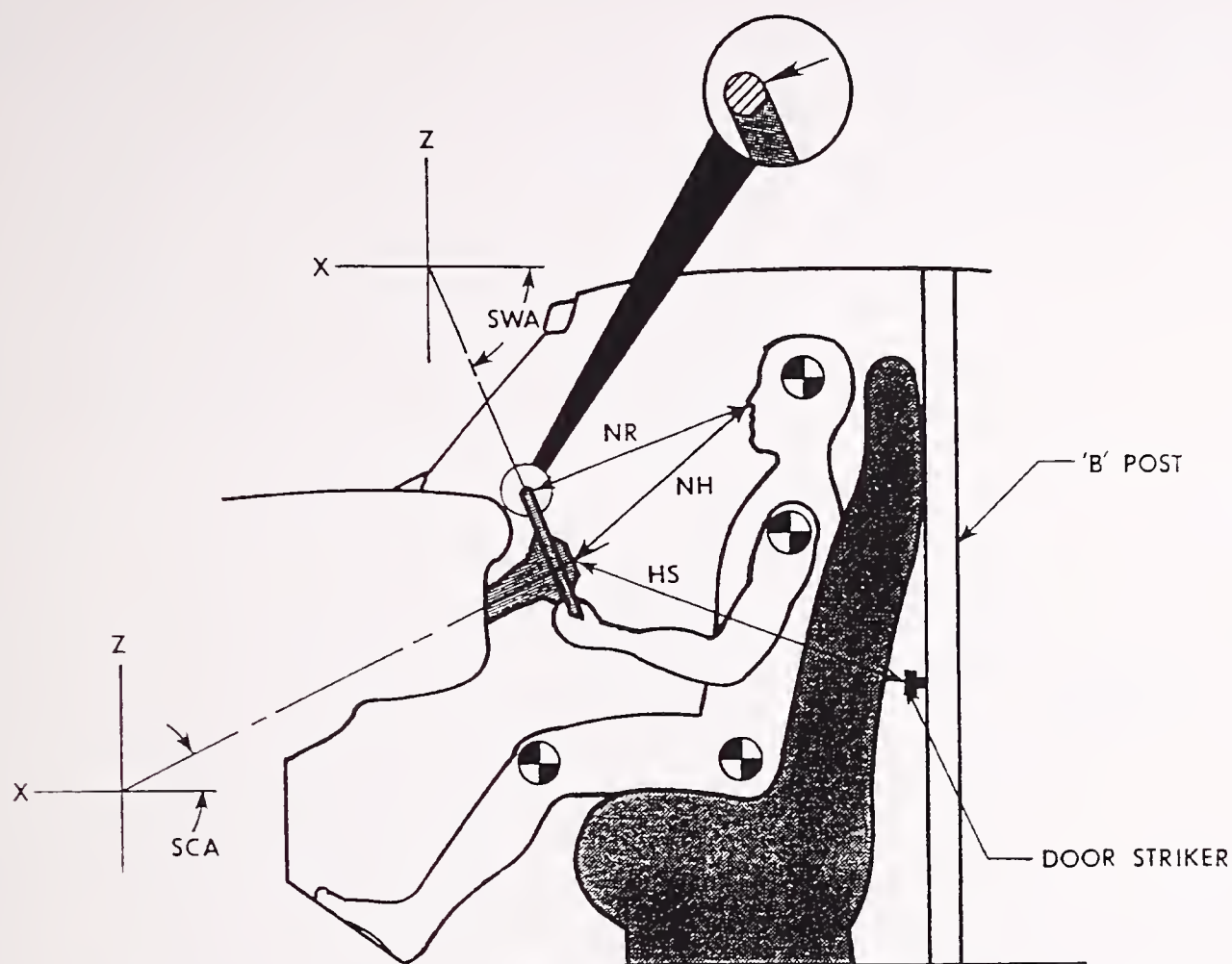
FIGURE 8 SEAT BELT POSITIONING DATA



A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	350
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	275
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	114
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	50
E - DUMMY CENTERLINE TO INTERSECTION OF UPPER TORSO BELT AND LAP BELT	300

ALL MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 9 DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
There were no steering column adjustments.

MEASUREMENTS

NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	420
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	405
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	759
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	24°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	66°

ALL DISTANCE MEASUREMENTS ARE IN MILLIMETERS.

FIGURE 10 CAMERA POSITIONS

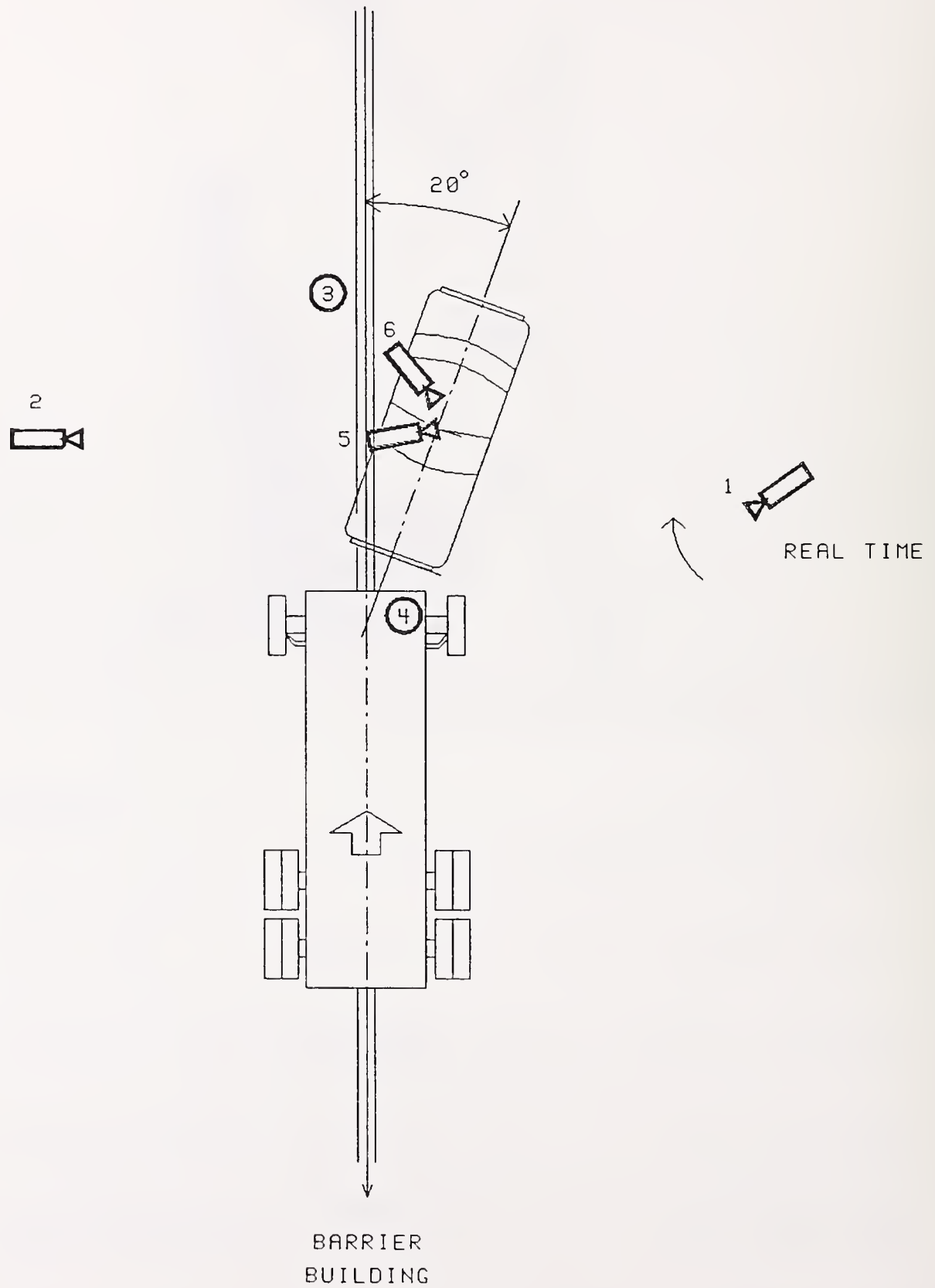


TABLE 10 MOTION PICTURE CAMERA INFORMATION

CAMERA NUMBER	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Bolex	18	24	Real-time documentation
2	Left wide	Photosonic	13	498	Vehicle dynamics
3	Overhead wide	Photosonic	8.5	500	Vehicle dynamics
4	Onboard truck	Photosonic	8	505	Dummy kinematics
5	Onboard car-front	Photosonic	8	985	Dummy kinematics
6	Onboard car-rear	Photosonic	8	998	Dummy kinematics

APPENDIX A

PHOTOGRAPHS



Figure A-1. PRE-TEST VEHICLE FRONT VIEW

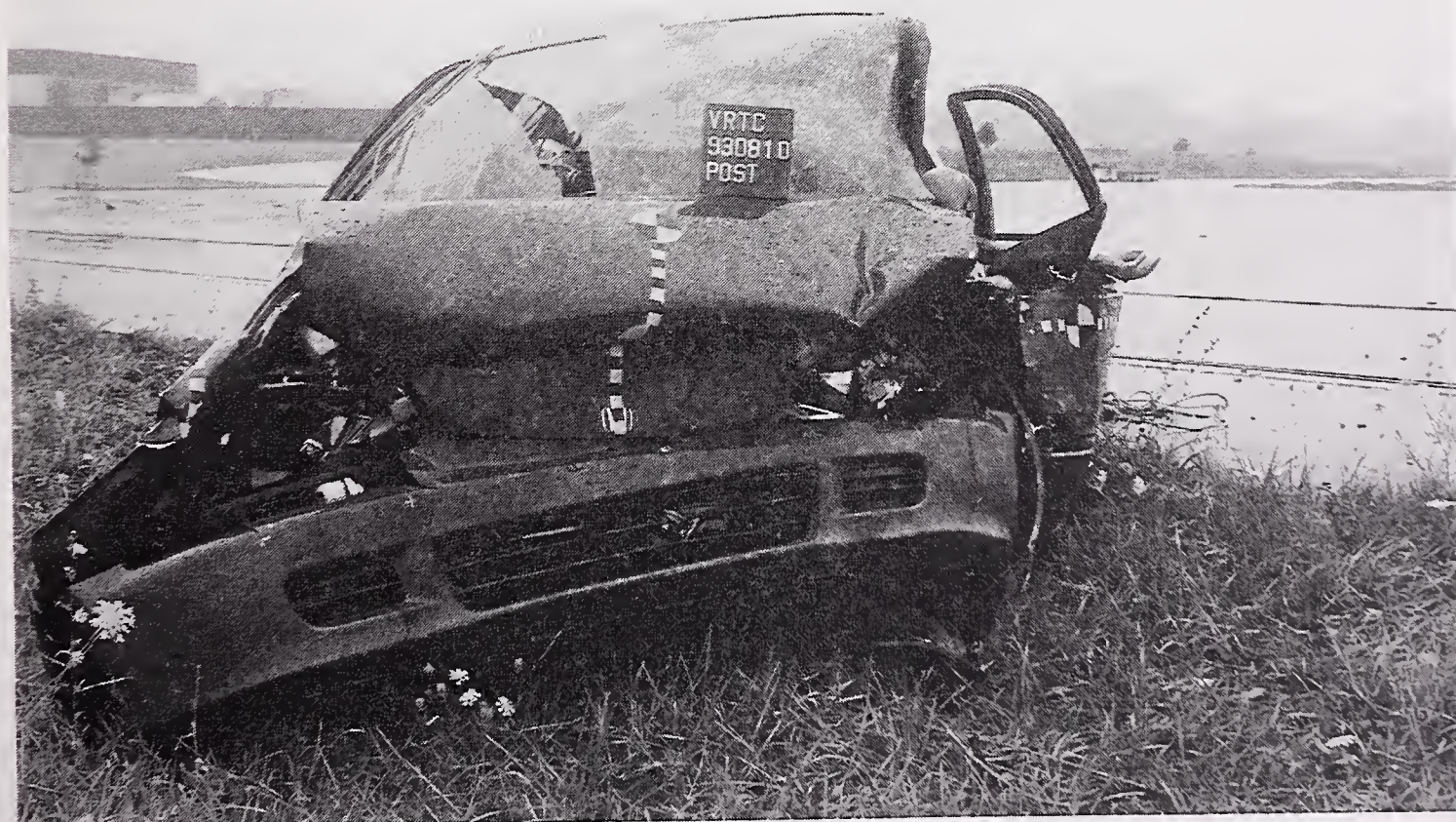


Figure A-2. POST-TEST VEHICLE FRONT VIEW



Figure A-3. PRE-TEST VEHICLE LEFT SIDE VIEW



Figure A-4. POST-TEST VEHICLE LEFT SIDE VIEW



Figure A-5. PRE-TEST VEHICLE REAR VIEW



Figure A-6. POST-TEST VEHICLE REAR VIEW



Figure A-7. PRE-TEST VEHICLE RIGHT SIDE VIEW



Figure A-8. POST-TEST VEHICLE RIGHT SIDE VIEW

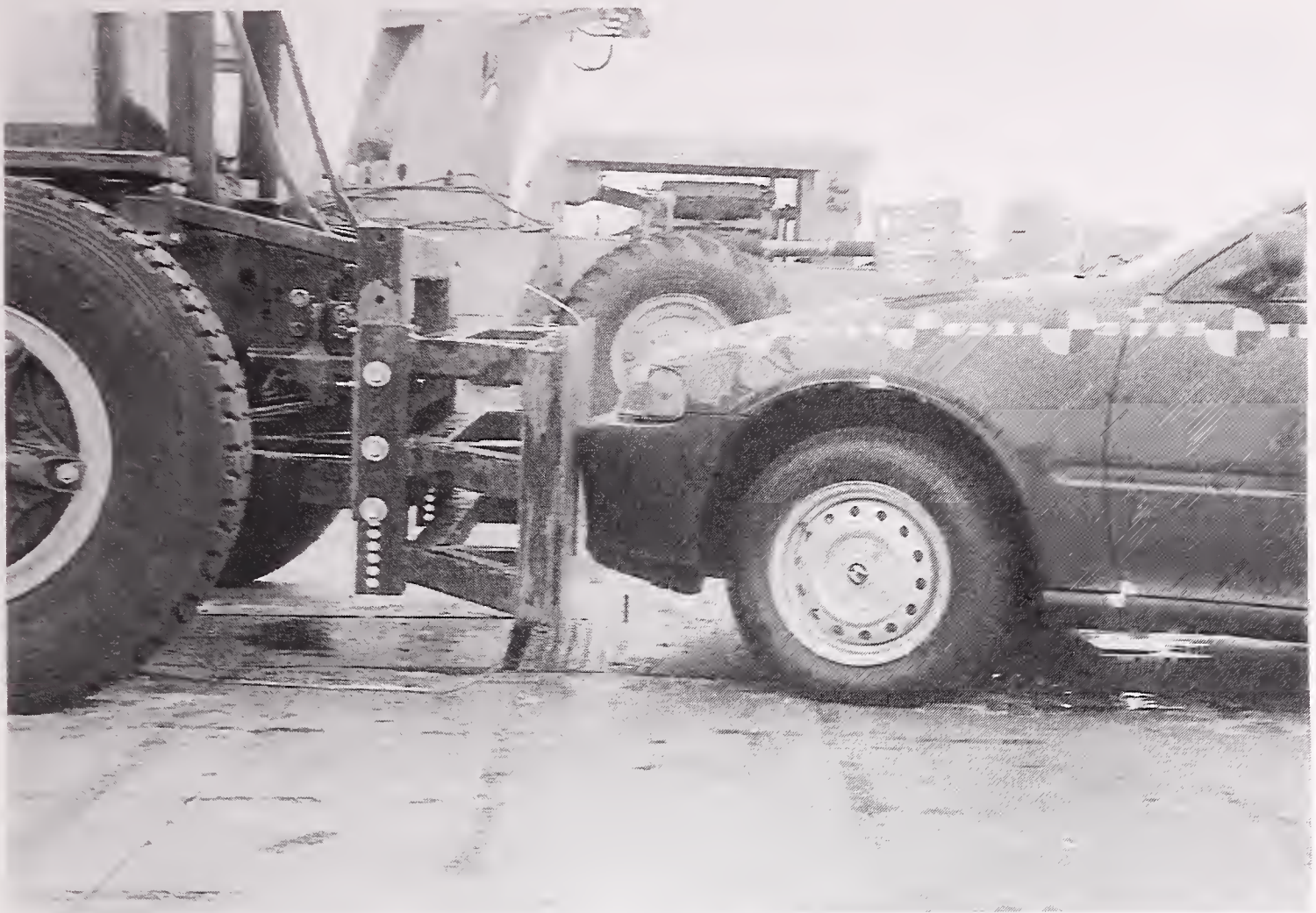


Figure A-9. PRE-TEST BUMPER ENGAGEMENT - VIEW 1



Figure A-10. PRE-TEST BUMPER ENGAGEMENT - VIEW 2

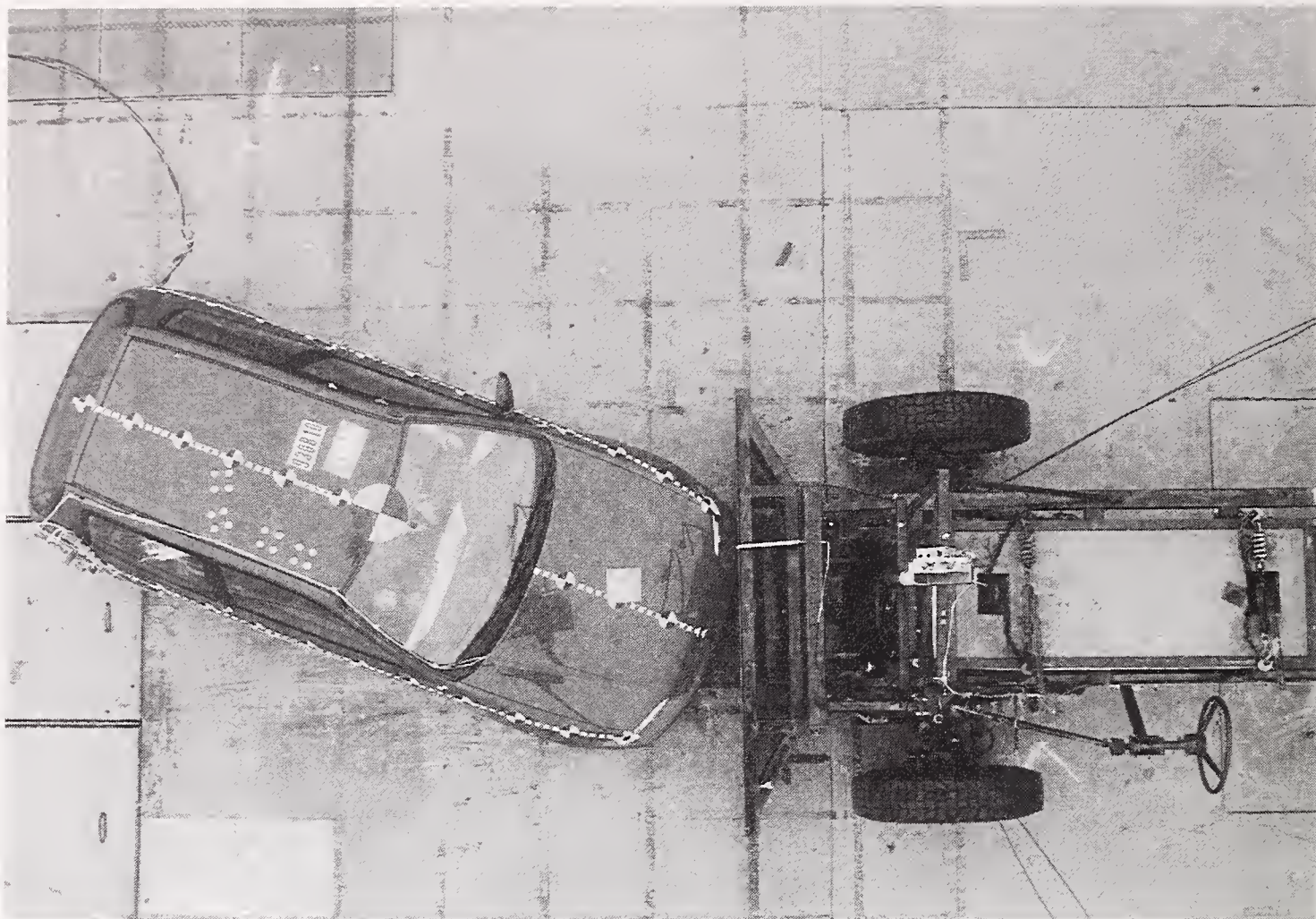


Figure A-11. PRE-TEST OVERHEAD - VIEW 1

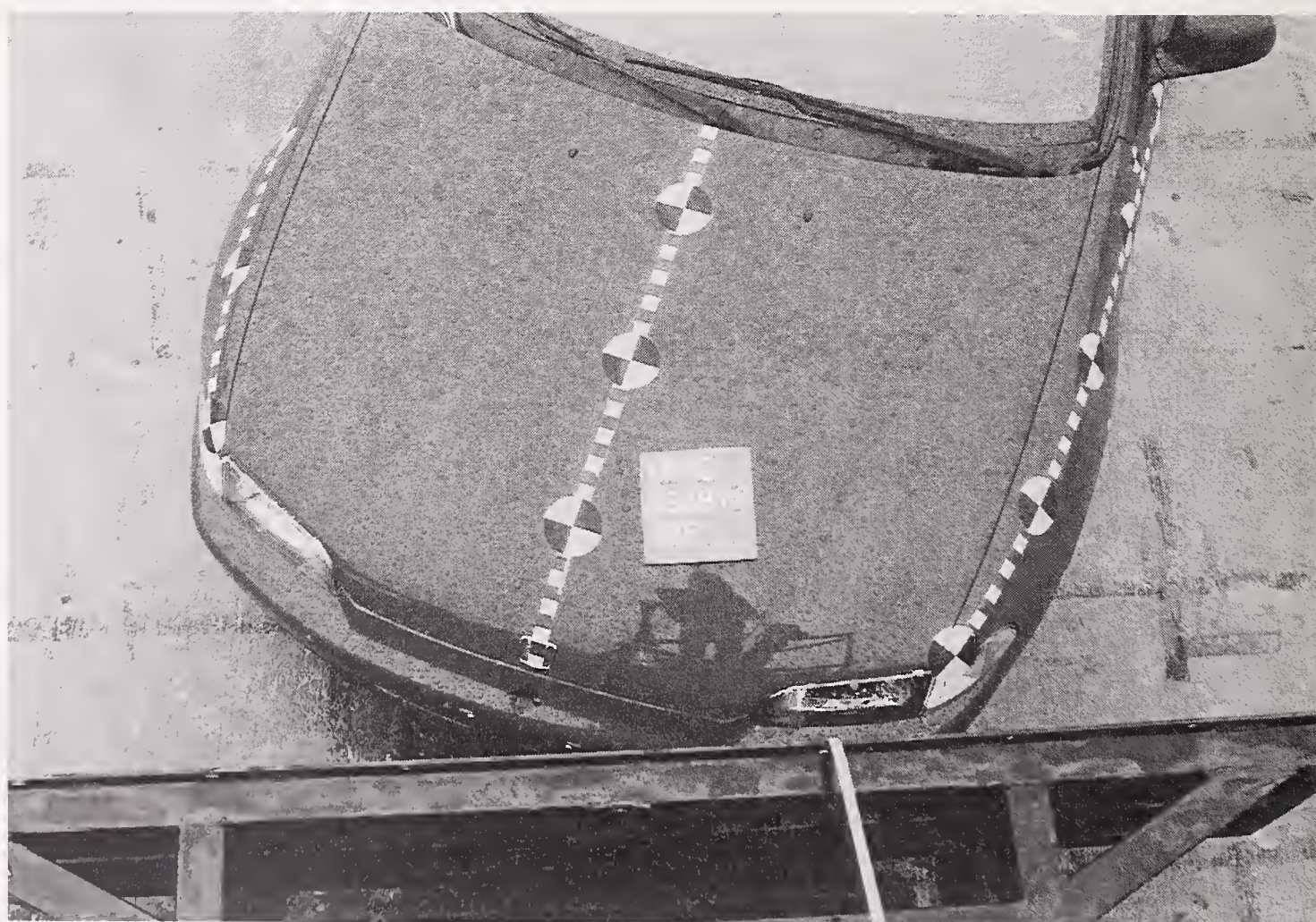


Figure A-12. PRE-TEST OVERHEAD - VIEW 2

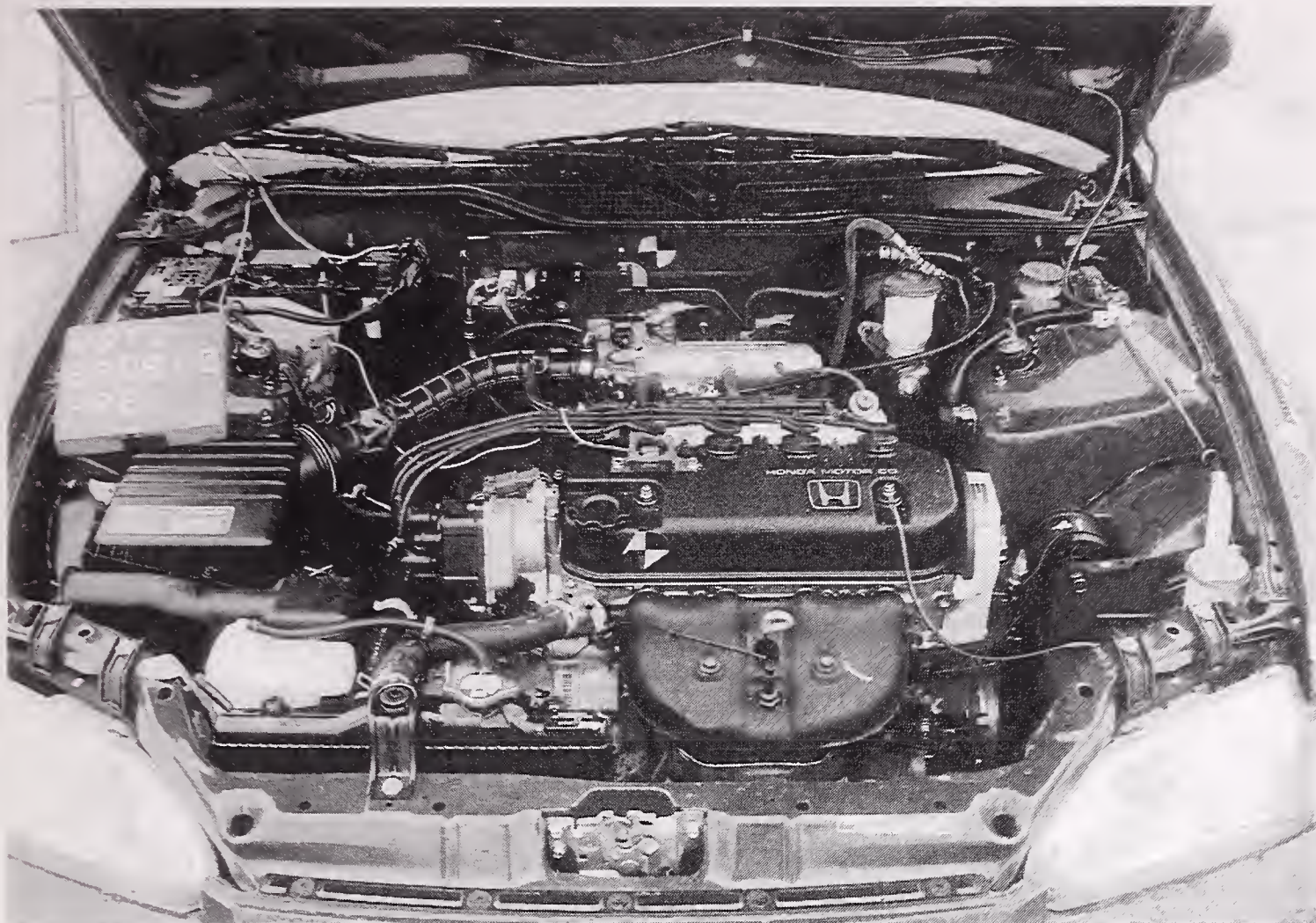


Figure A-13. PRE-TEST VEHICLE ENGINE COMPARTMENT VIEW



Figure A-14. PRE-TEST VEHICLE WINDSHIELD VIEW



Figure A-15. POST-TEST VEHICLE WINDSHIELD VIEW



Figure A-16. POST-TEST TRUCK LEFT SIDE VIEW

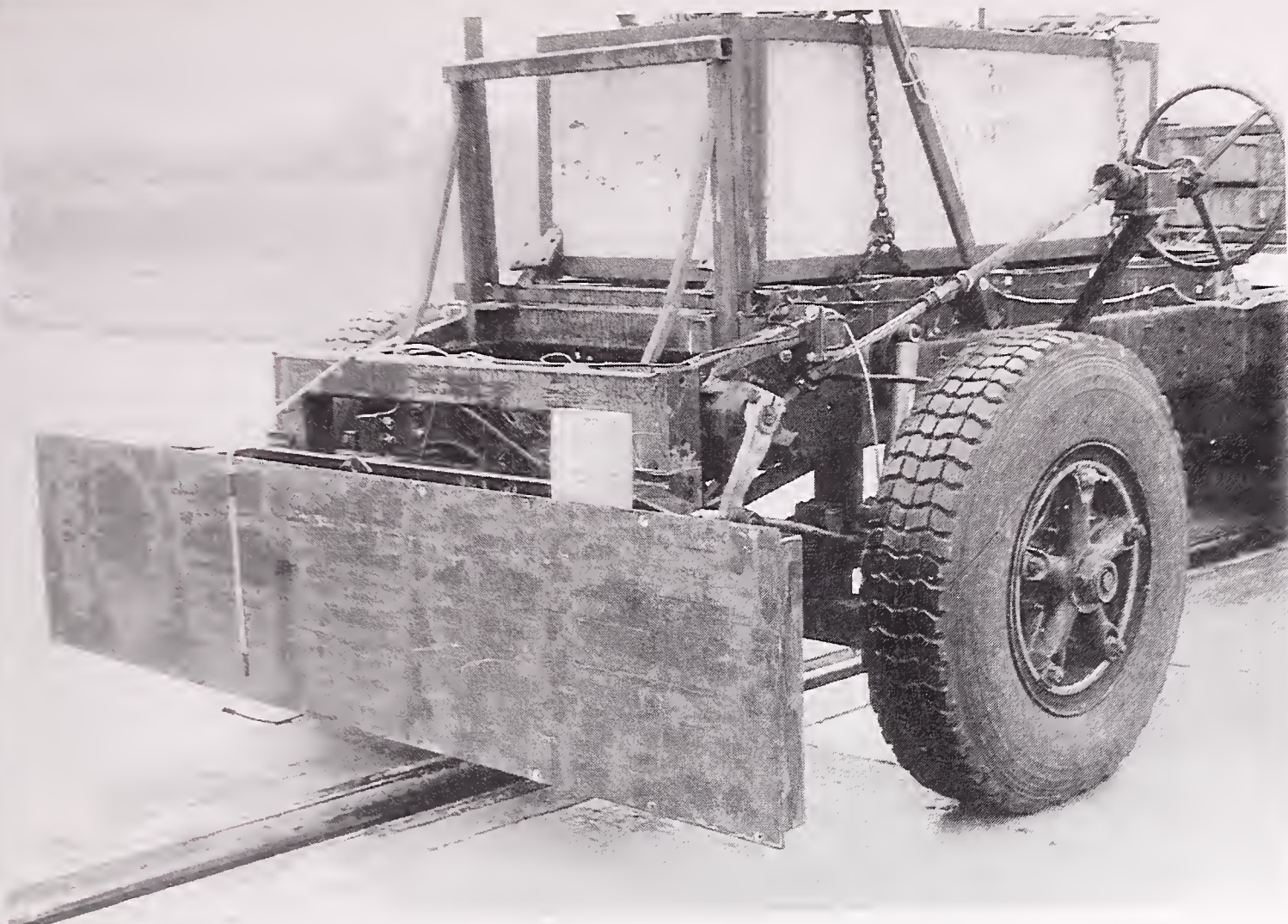


Figure A-17. PRE-TEST TRUCK LEFT FRONT VIEW



Figure A-18. POST-TEST TRUCK LEFT FRONT VIEW

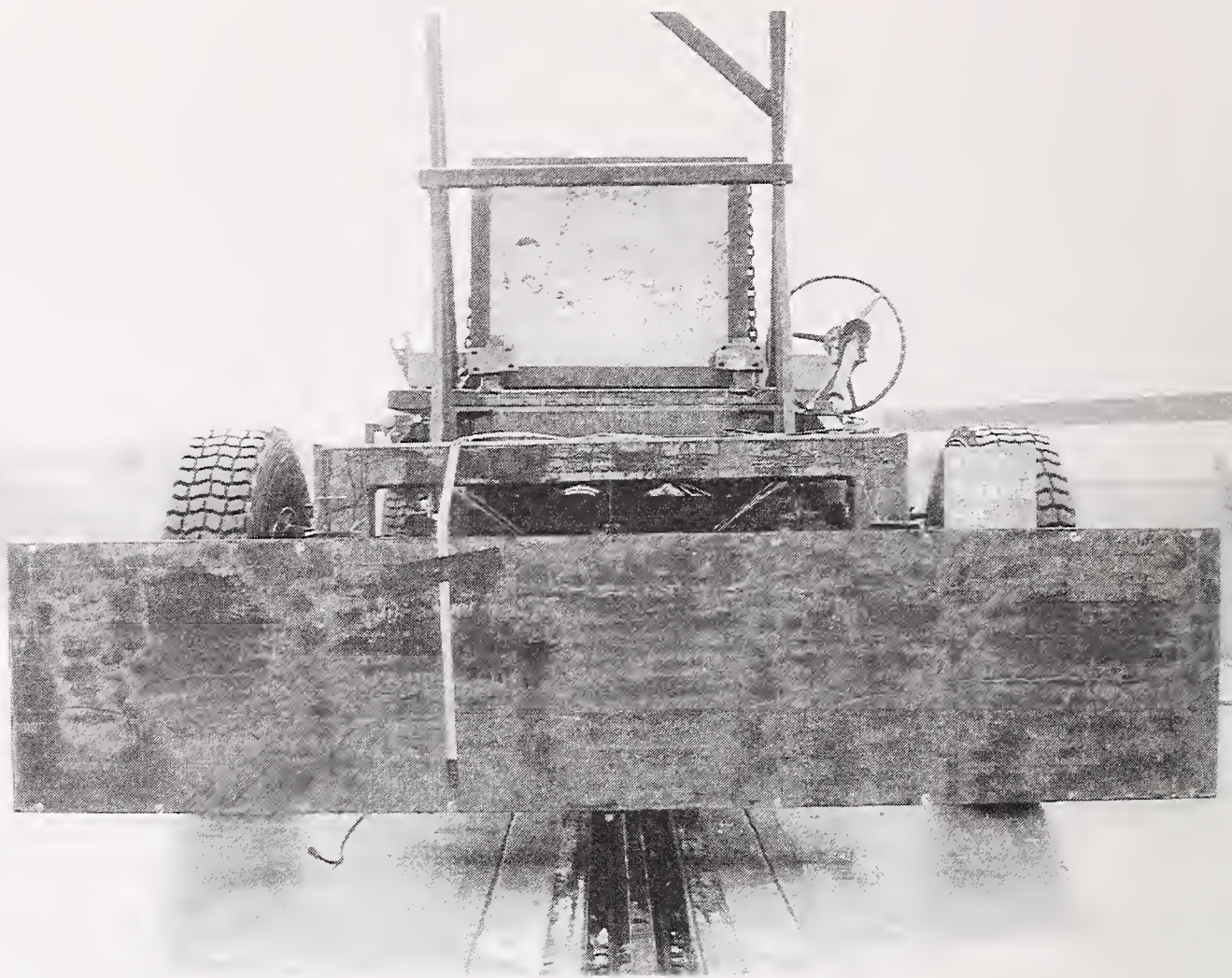


Figure A-19. PRE-TEST TRUCK FRONT VIEW

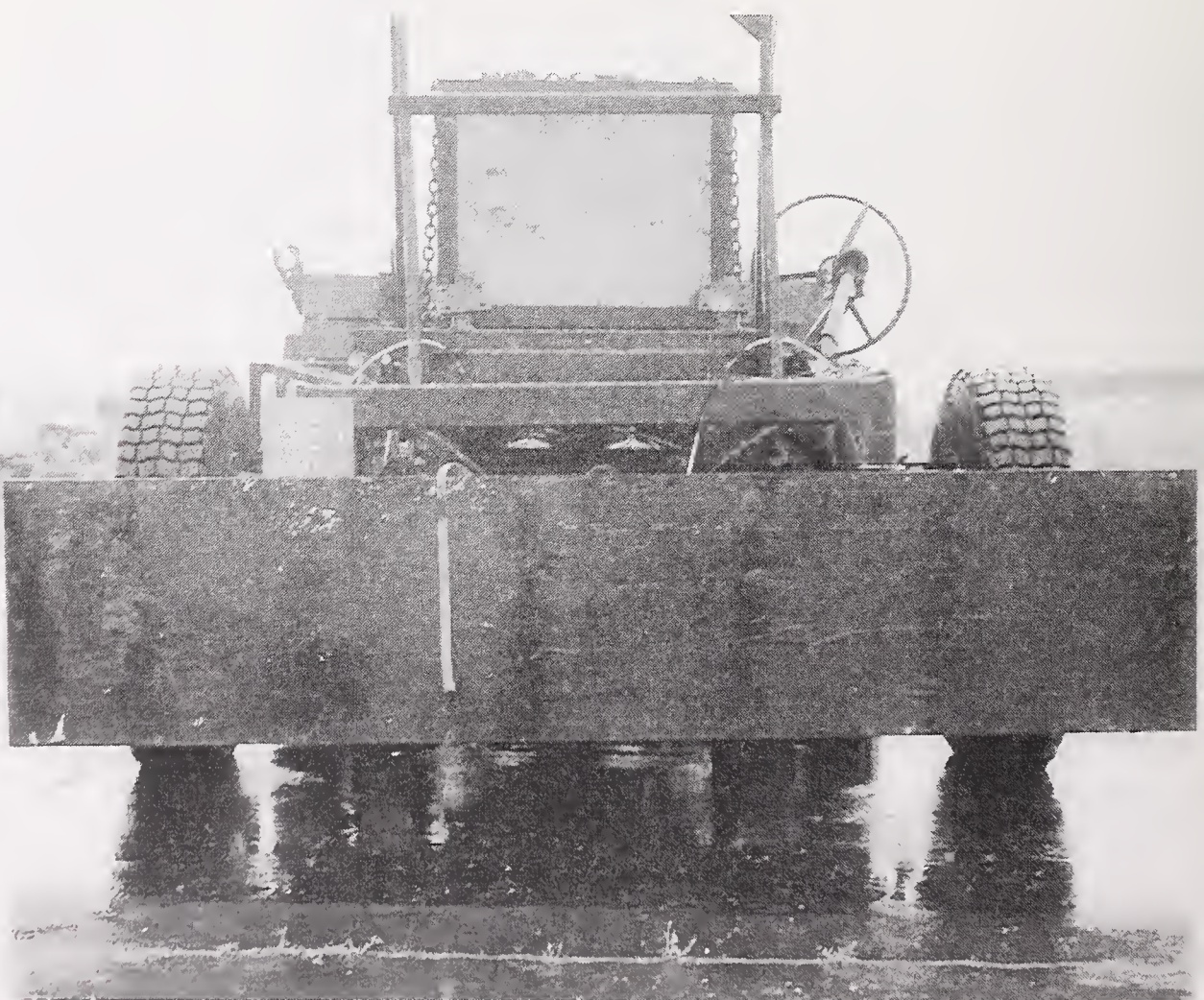


Figure A-20. POST-TEST TRUCK FRONT VIEW

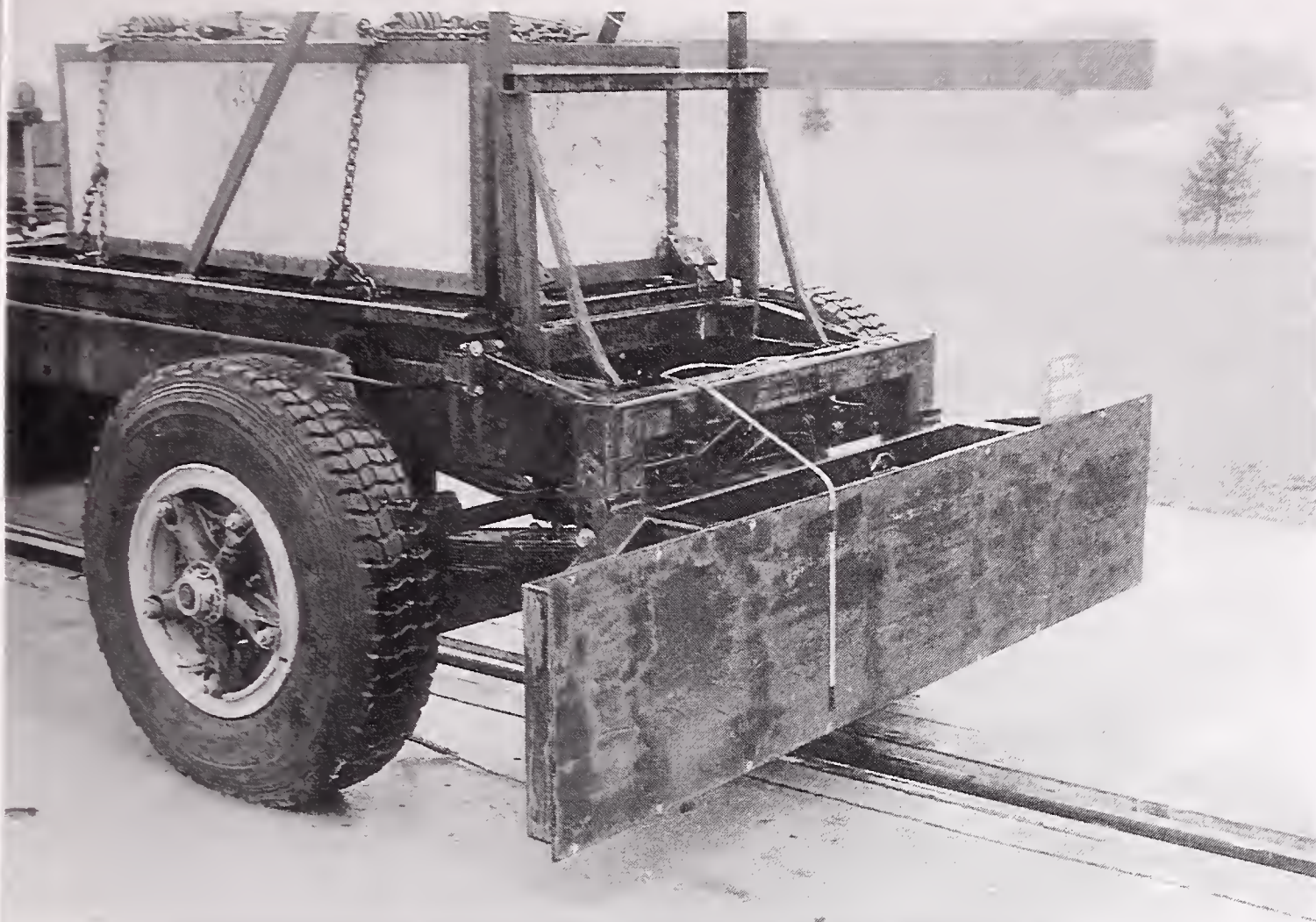


Figure A-21. PRE-TEST TRUCK RIGHT FRONT VIEW

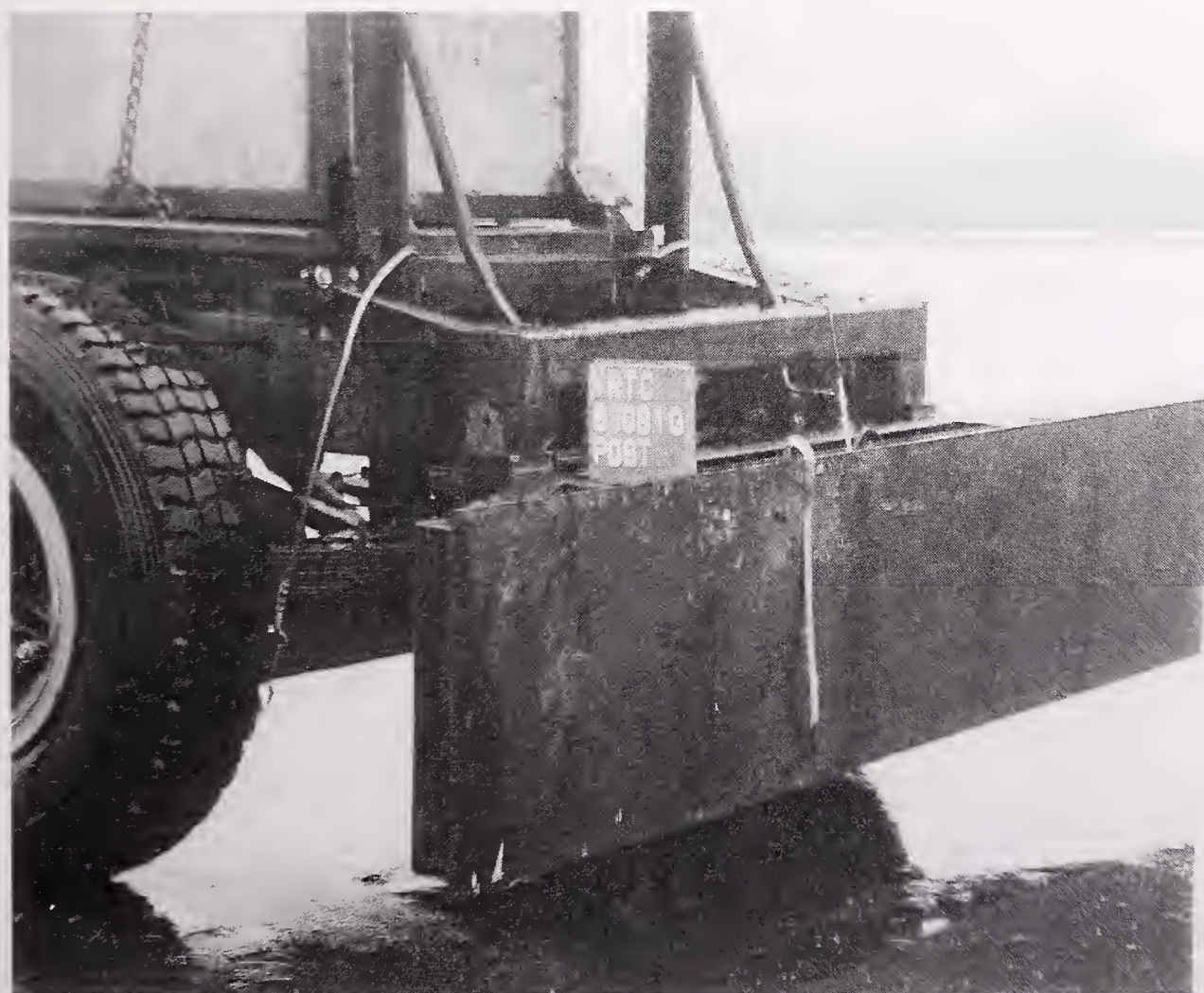


Figure A-22. POST-TEST TRUCK RIGHT FRONT VIEW



Figure A-23. POST-TEST TRUCK RIGHT SIDE VIEW



Figure A-24. PRE-TEST DUMMY VIEW



Figure A-25. POST-TEST DUMMY VIEW



Figure A-26. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 1



Figure A-27. PRE-TEST VEHICLE INTERIOR AND DUMMY - VIEW 2



Figure A-28. POST-TEST DUMMY HEAD CONTACT VIEW

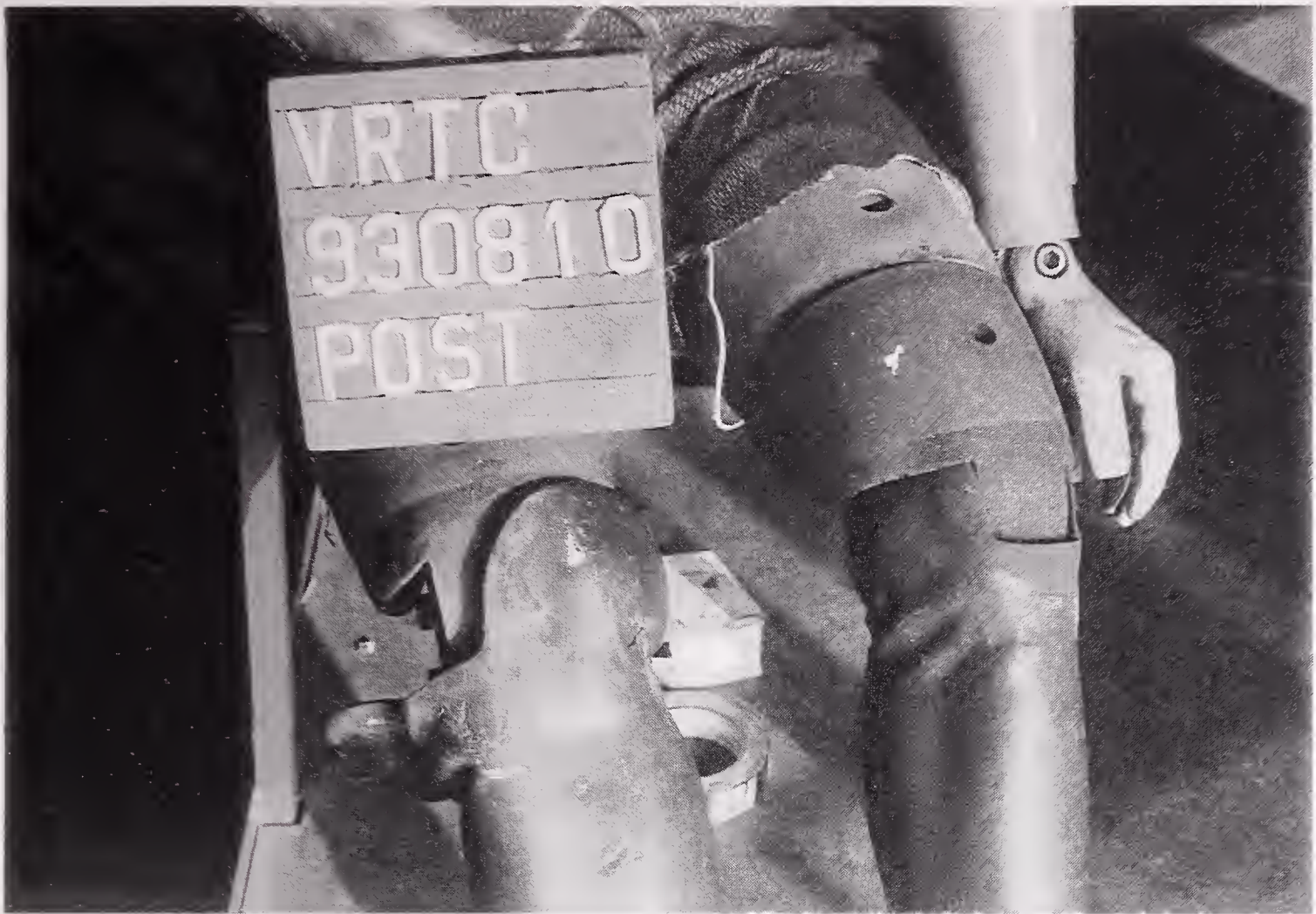


Figure A-29. POST-TEST DUMMY KNEE CONTACT VIEW



Figure A-30. POST-TEST VEHICLE DAMAGE CLOSE-UP - VIEW 1

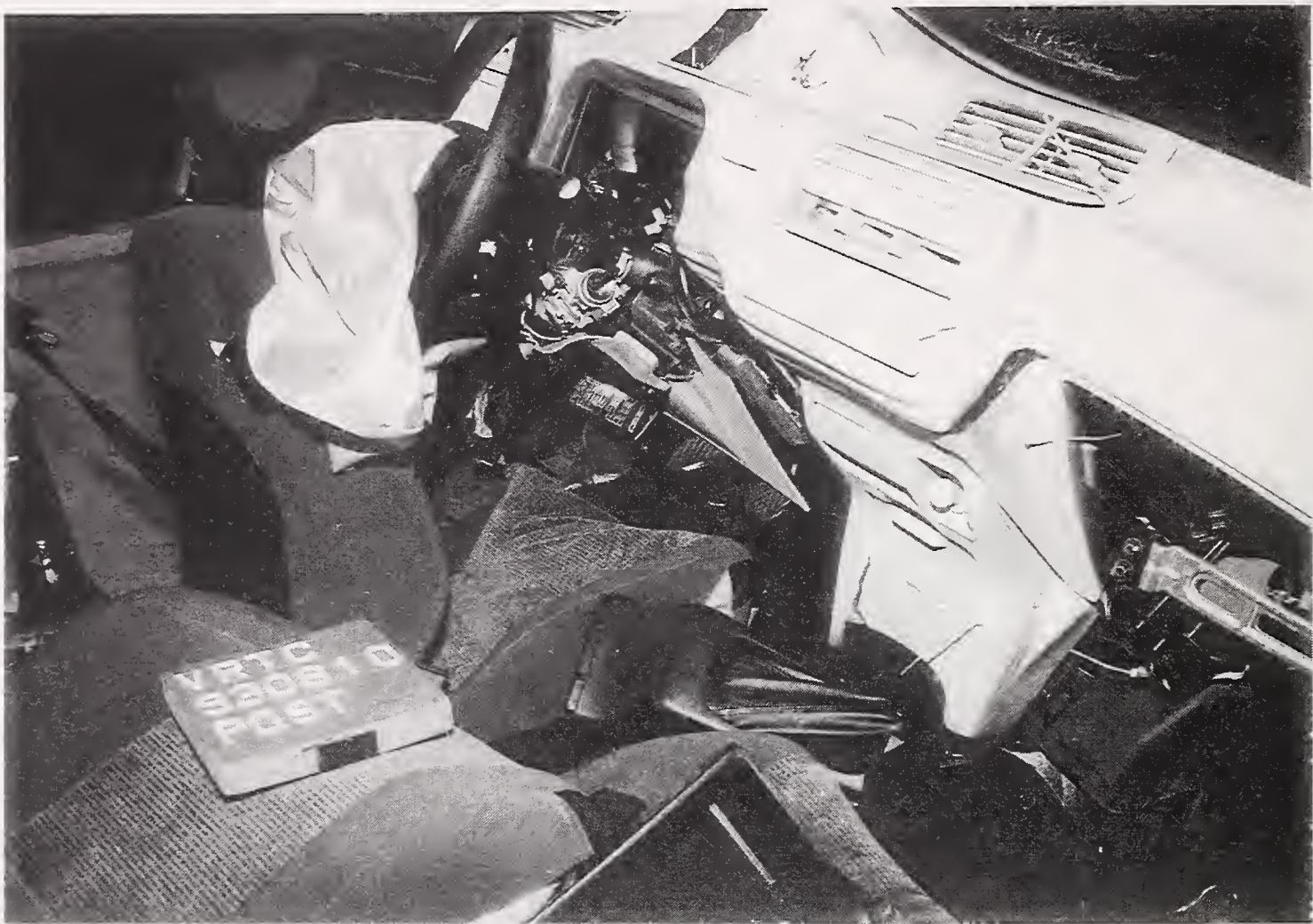


Figure A-31. POST-TEST VEHICLE DAMAGE CLOSE-UP - VIEW 2

APPENDIX B

DATA PLOTS



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER HEAD X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC

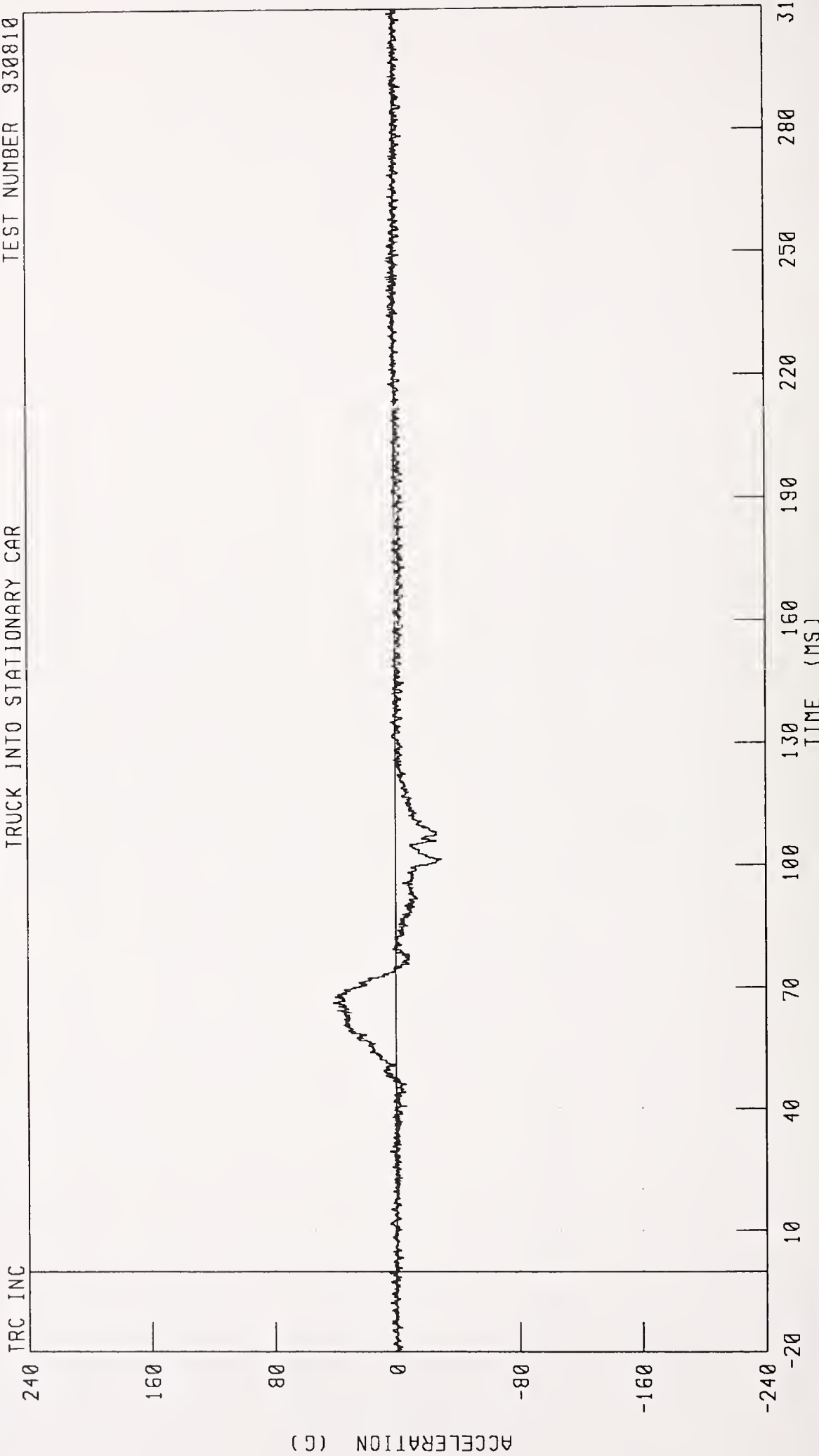


CHANNEL HEDXG1 FILTER CH CLASS 1000

PEAK DATA 65 92 G @ 108 13 MS, -130.12 G @ 63.75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER HEAD Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



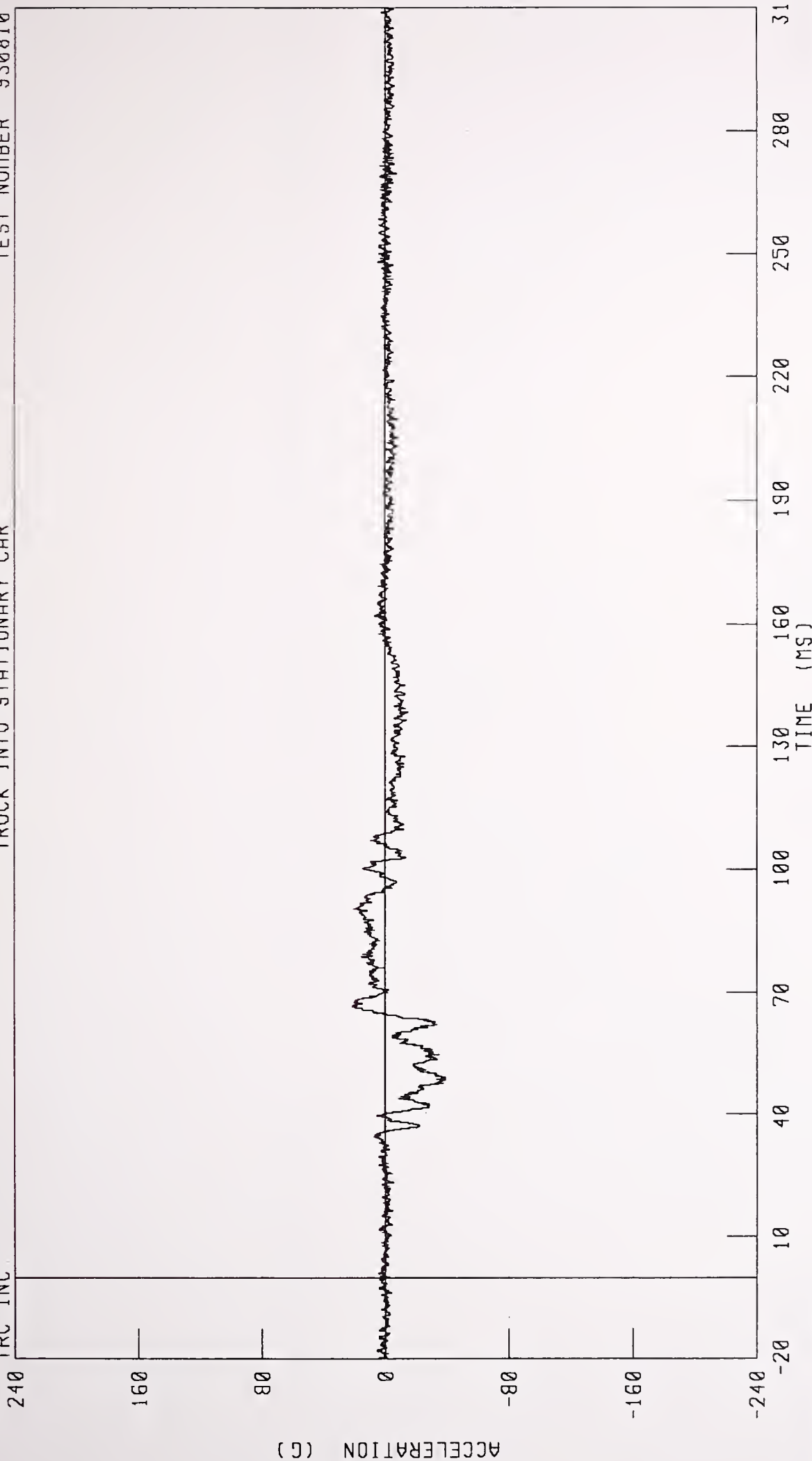
CHANNEL HEDYG1 FILTER CH CLASS 1000

PEAK DATA 41 17 G @ 66 25 MS, -29 56 G @ 101 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER HEAD Z-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL HEDZG1 FILTER CH CLASS 1000

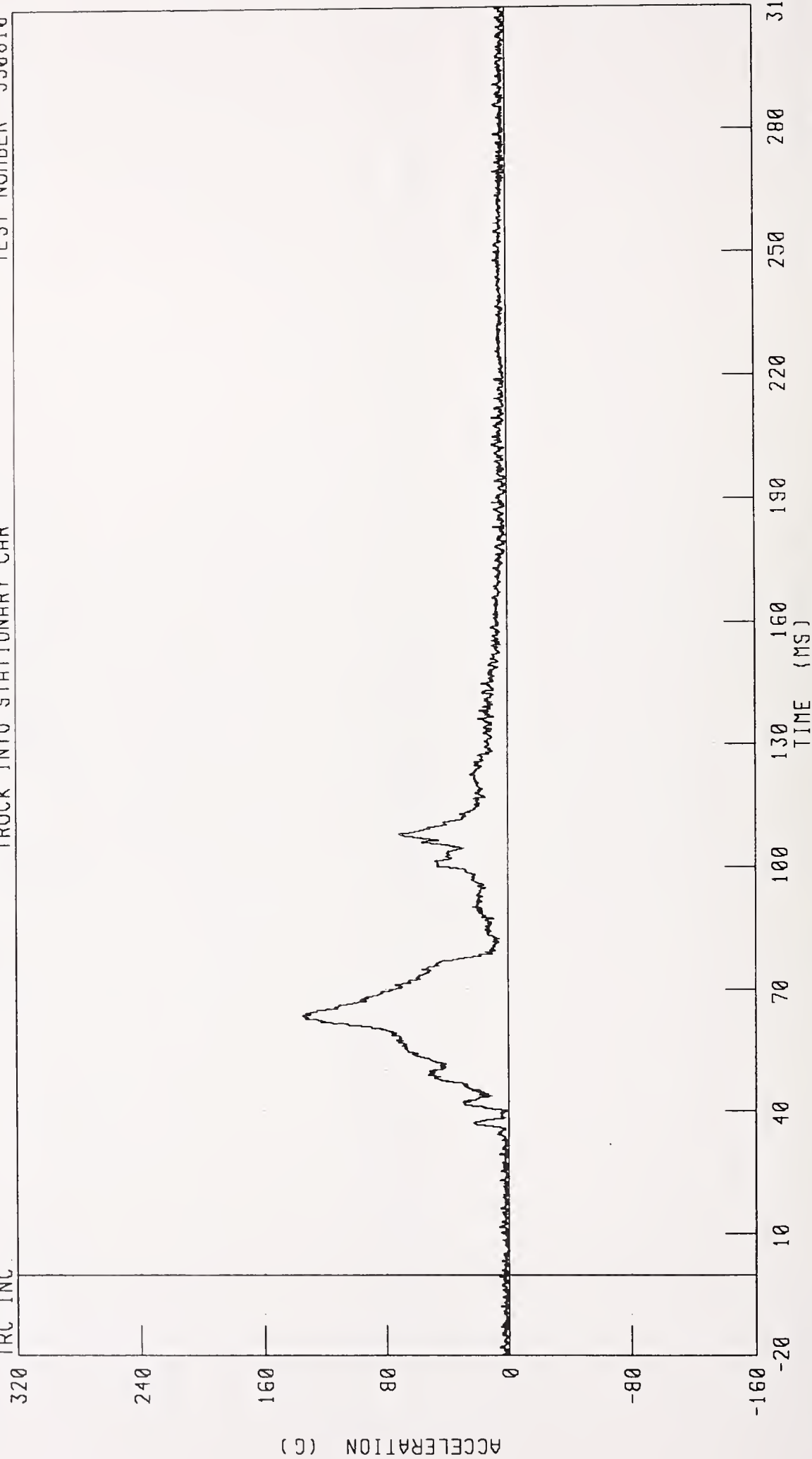
PEAK DATA 22 03 G @ 66 38 MS, -39 34 G @ 49 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 DRIVER HEAD RESULTANT ACCELERATION

TEST NUMBER 930810

TRUCK INTO STATIONARY CAR

TRC INC.



CHANNEL HEDRG1 FILTER CH. CLASS 1000

PEAK DATA 134 86 G @ 63 75 MS, 0 19 G @ 195 13 MS

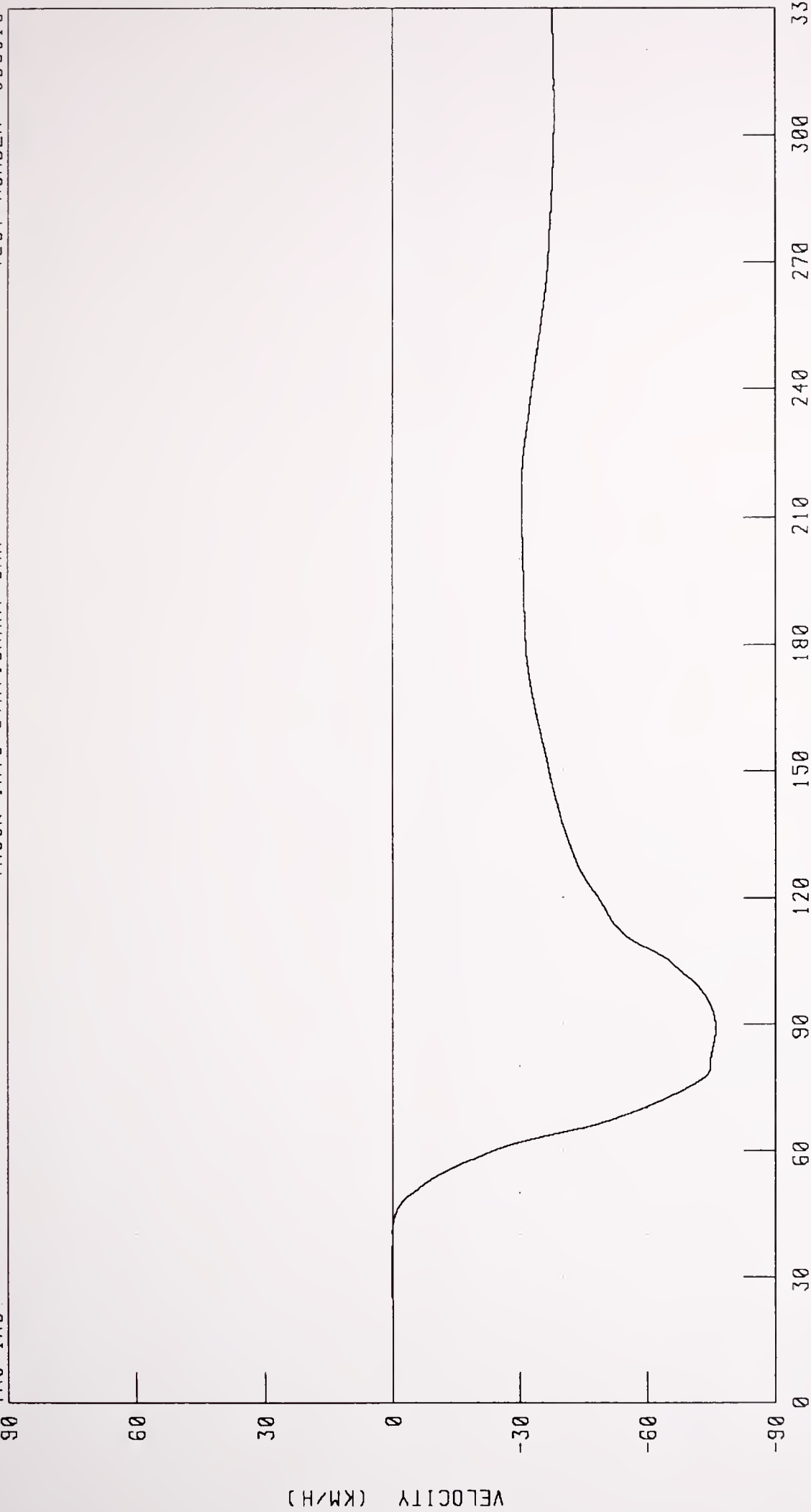
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER HEAD X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TRC INC

TEST NUMBER 930810



CHANNEL HEDXV1 FILTER CH CLASS 180

PEAK DATA 0 22 KM/H @ 36 00 MS, -75 90 KM/H @ 89 38 MS

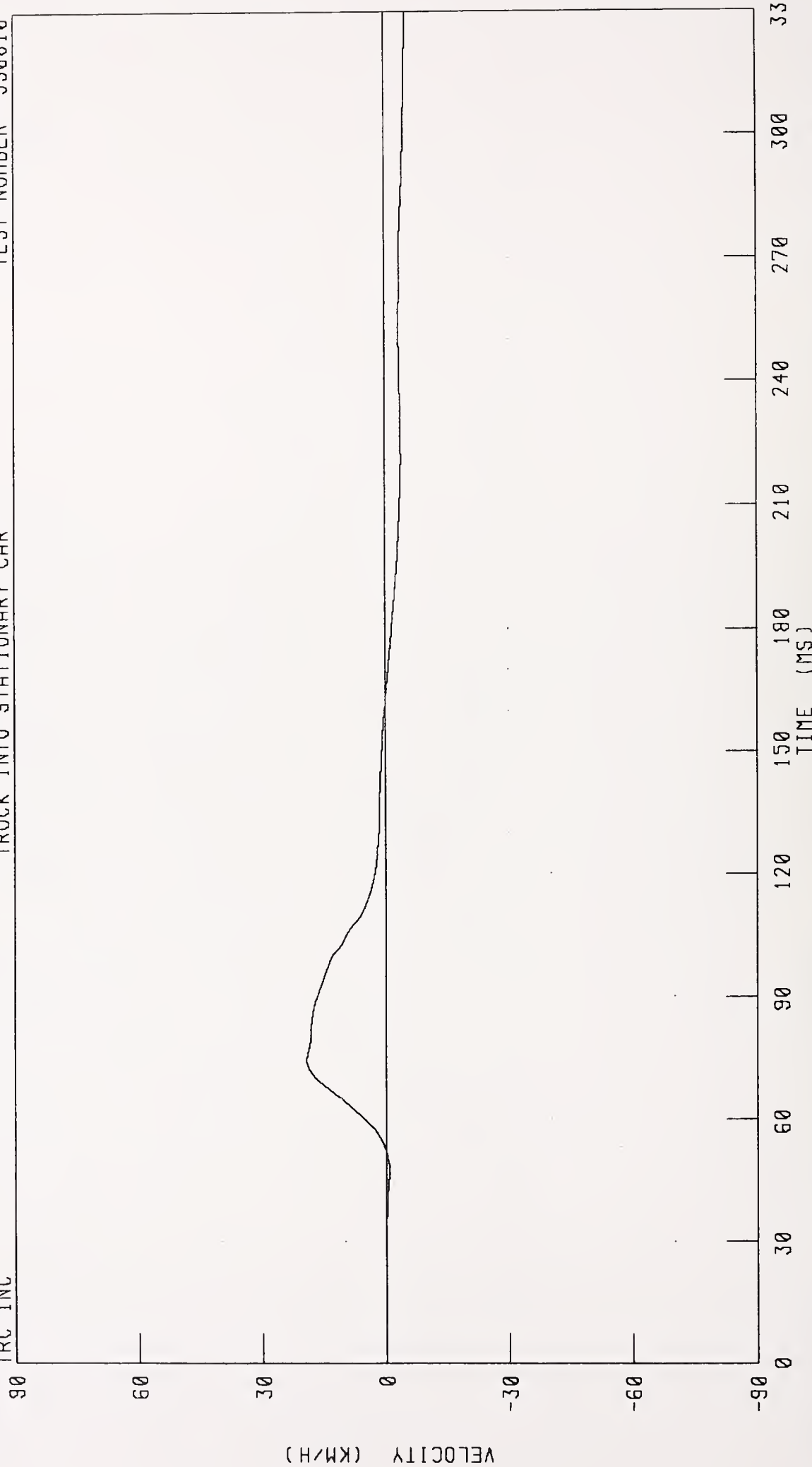
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER HEAD Y-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL: HEDYV1 FILTER: CH. CLASS 180

PEAK DATA 19 23 KM/H @ 74 50 MS, -5 06 KM/H @ 328 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER HEAD Z-AXIS VELOCITY
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL: HEDZV1 FILTER: CH CLASS 180

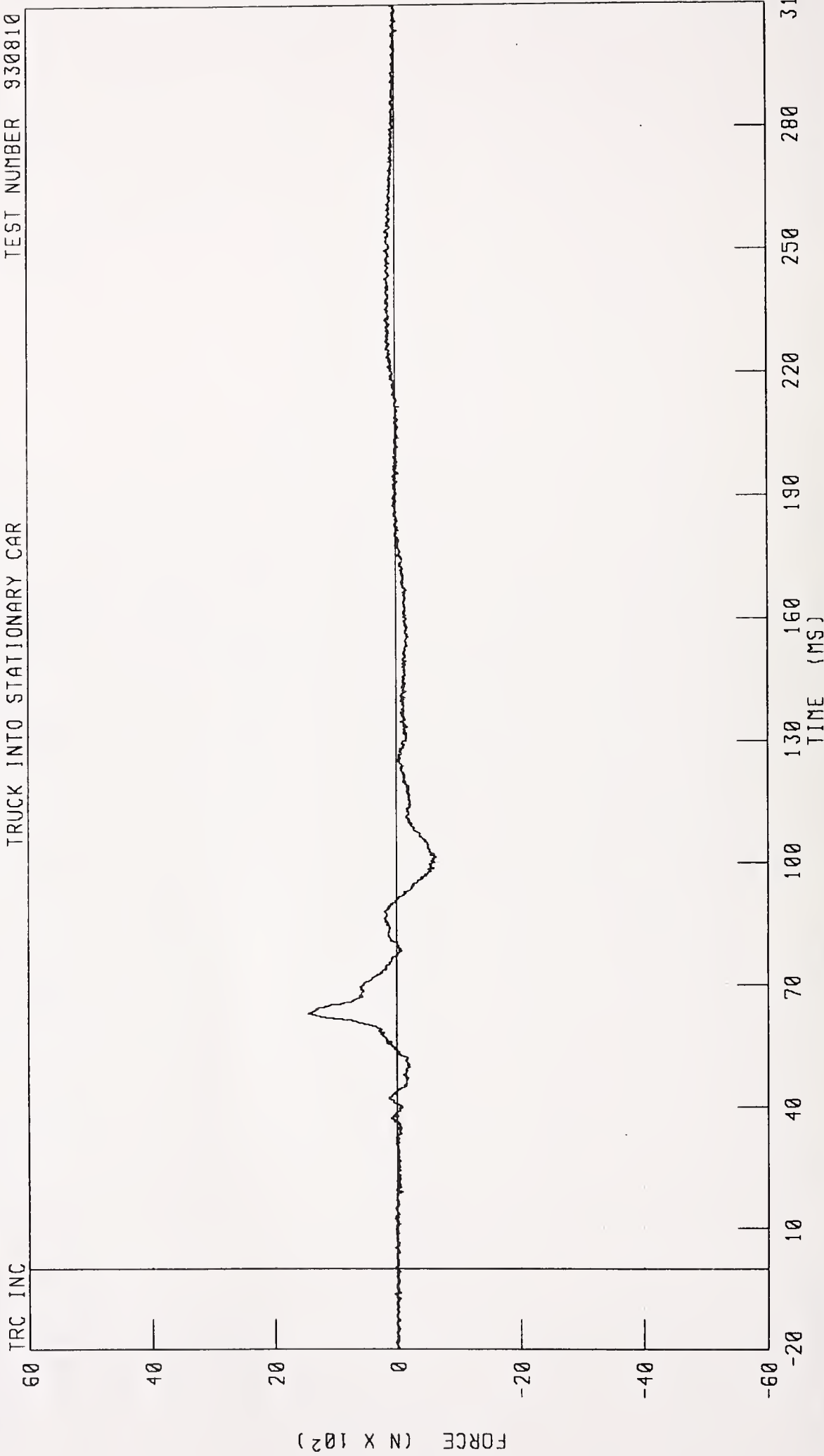
PEAK DATA 0 18 KM/H @ 5 38 MS, -30 76 KM/H @ 330 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER NECK X-AXIS SHEAR FORCE

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

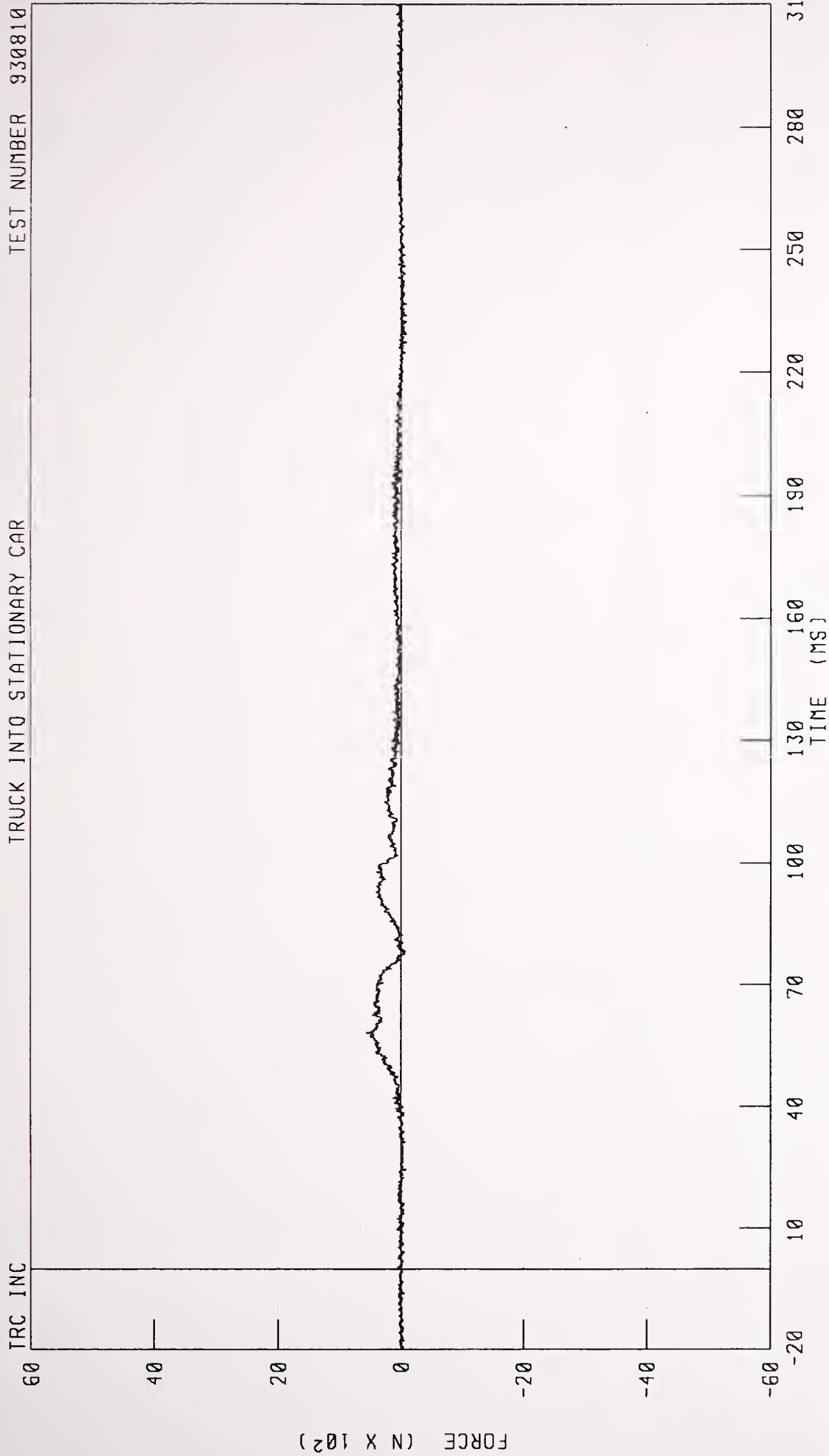


CHANNEL NEKXF1 FILTER CH CLASS 1000

PEAK DATA 1450 15 N @ 63 13 MS, -641 50 N @ 101 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK Y-AXIS SHEAR FORCE
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



CHANNEL NEKYF1 FILTER CH CLASS 1000

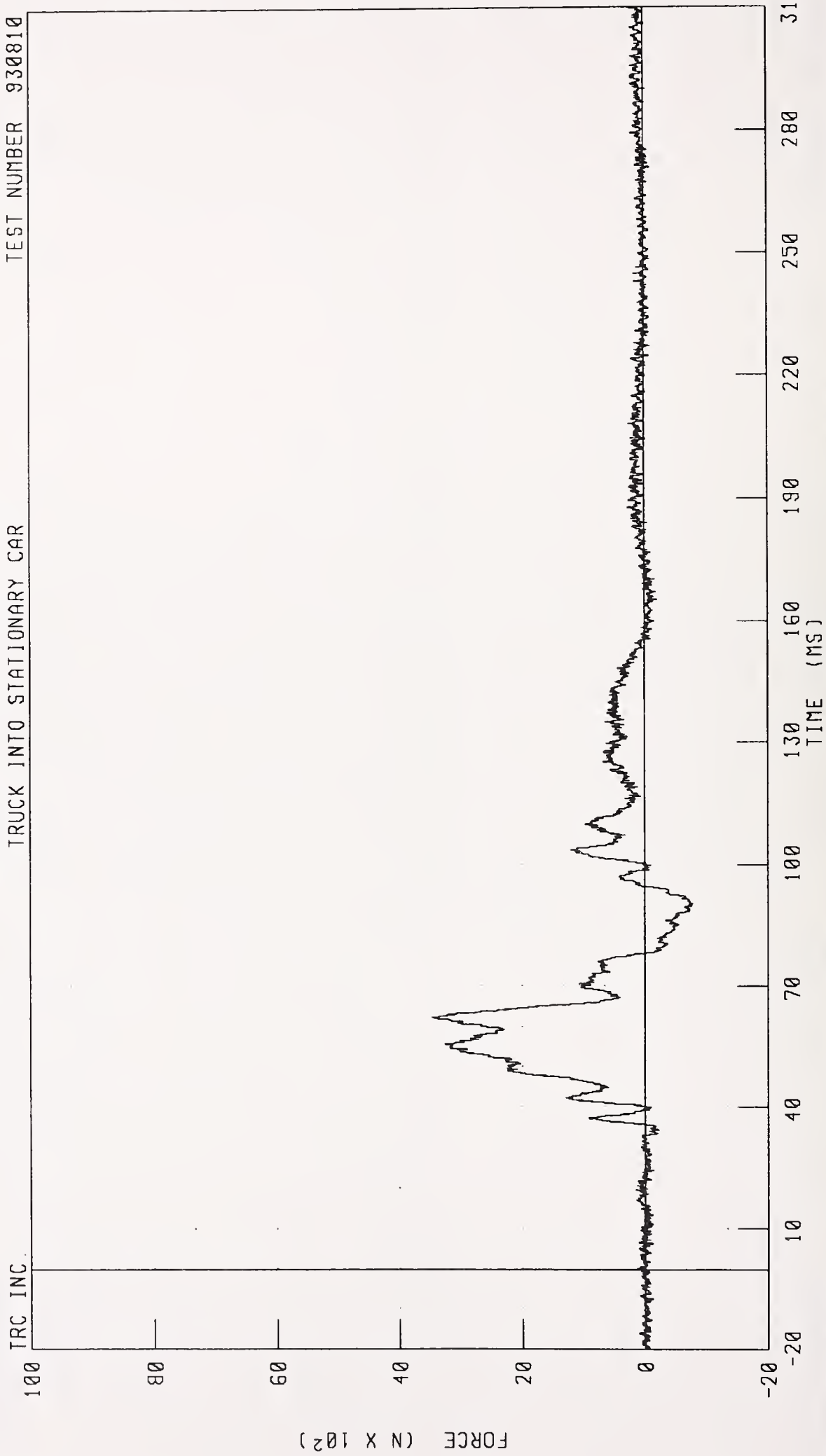
PEAK DATA 554 95 N @ 58 13 MS, -90 35 N @ 227 25 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER NECK Z-AXIS AXIAL FORCE

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

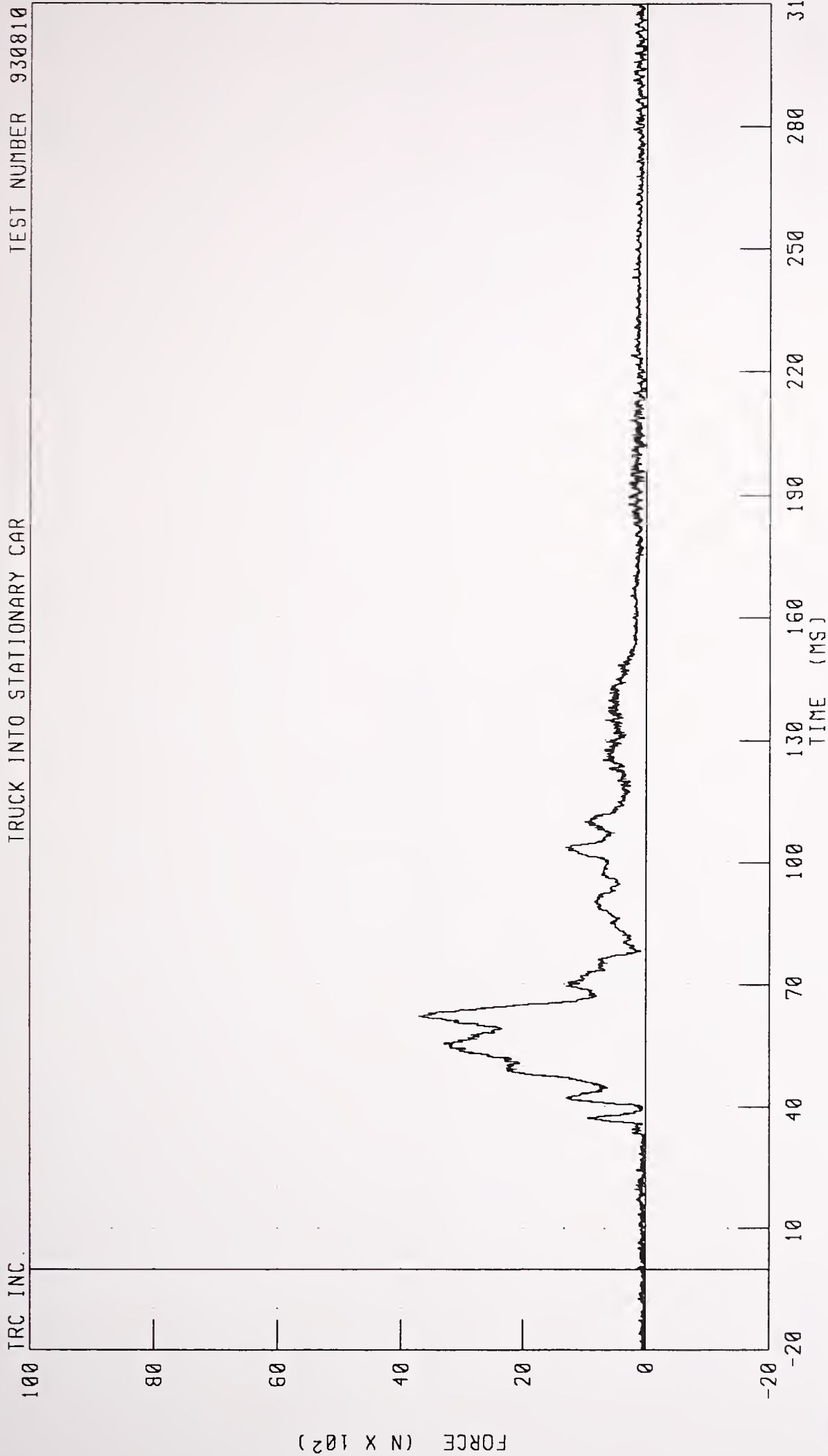


CHANNEL: NEKZF1 FILTER CH. CLASS 1000

PEAK DATA 3467 BI N @ 62 38 MS, -775 23 N @ 90 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK RESULTANT FORCE
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

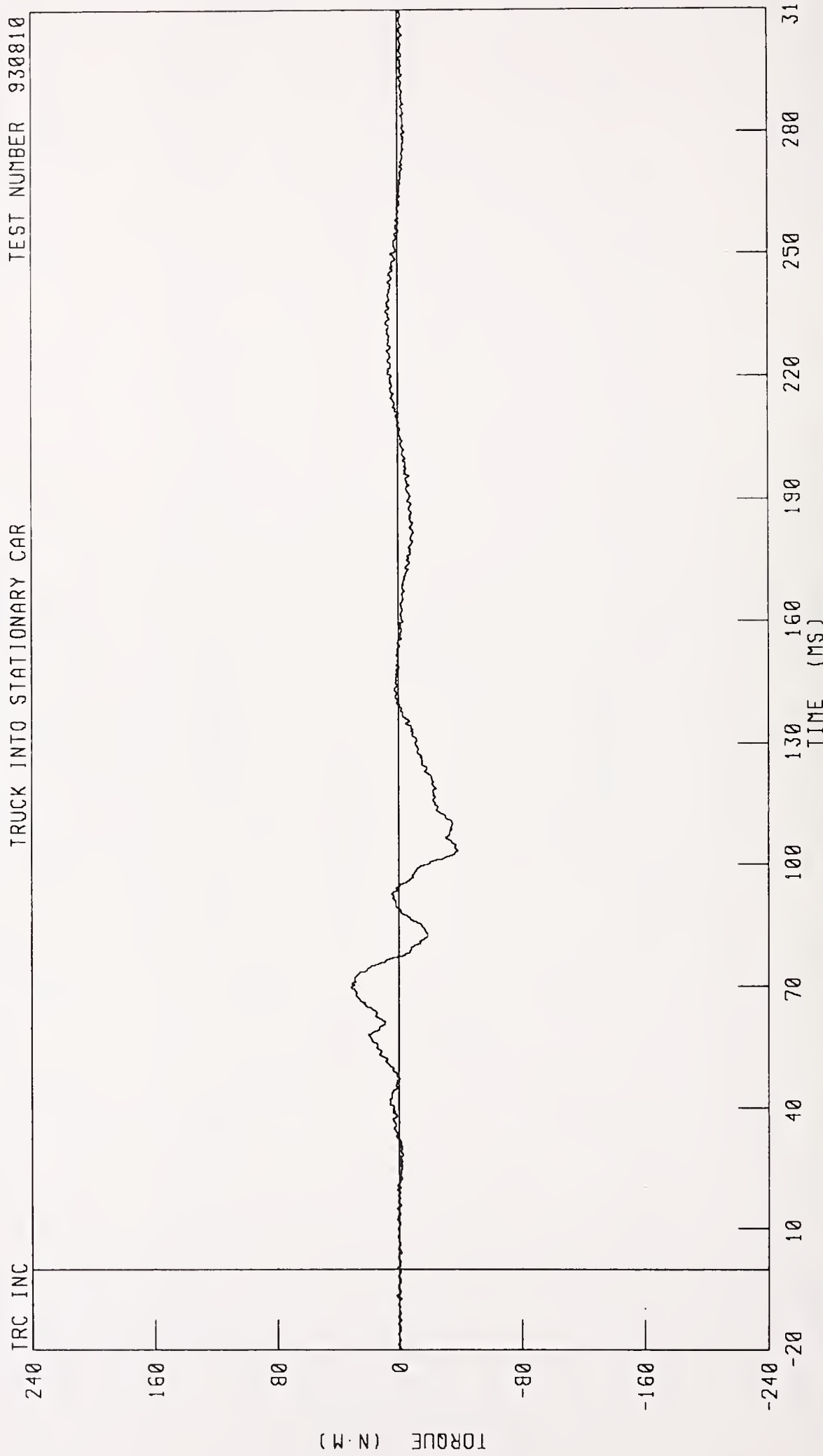


CHANNEL NEKRF1 FILTER CH CLASS 1000

PEAK DATA 3704 56 N @ 62 38 MS, 1 92 N @ -9 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK MOMENT ABOUT X AXIS
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

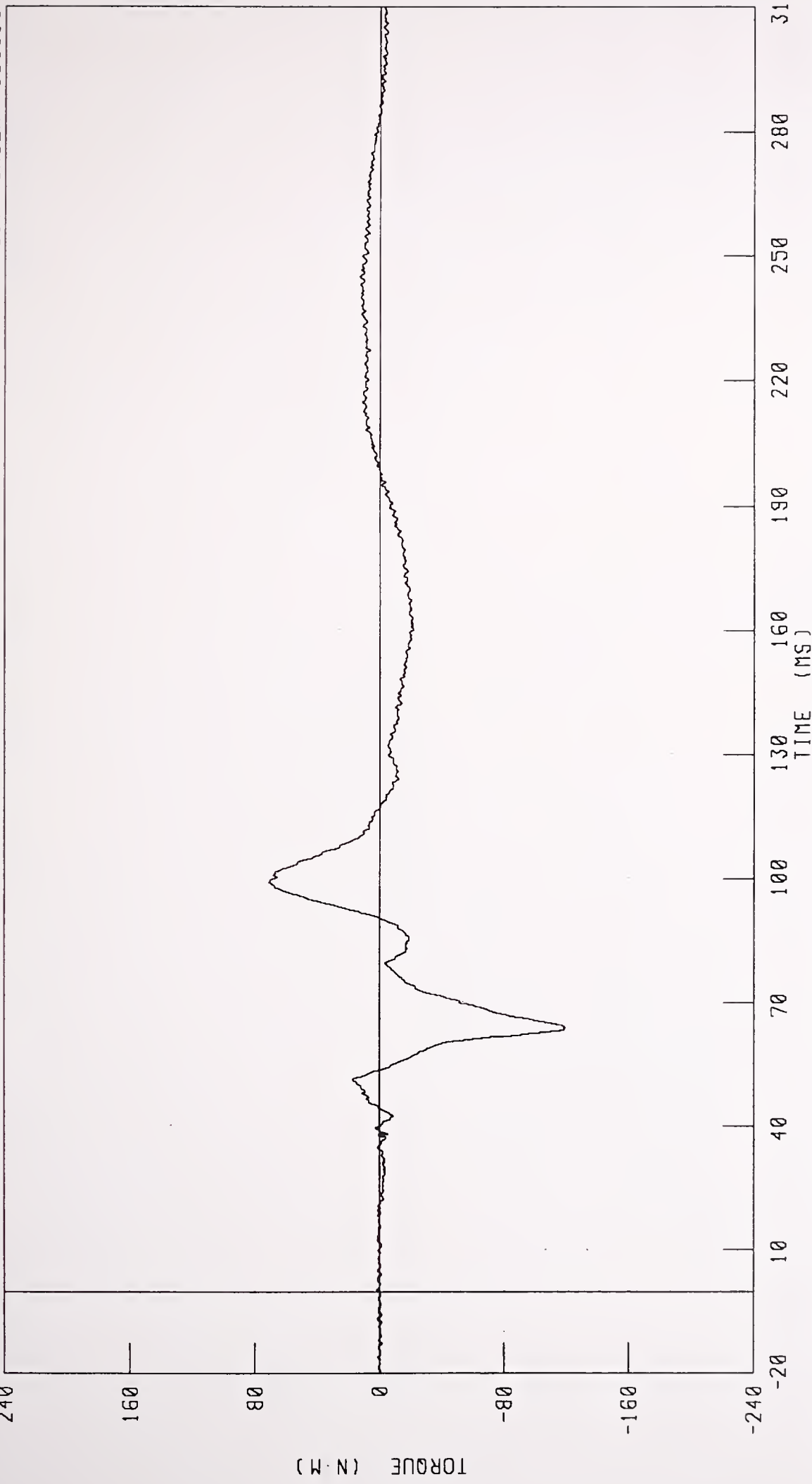


CHANNEL: NEKXM1 FILTER CH CLASS 600

PEAK DATA 31 94 N M @ 69 88 MS, -38 38 N M @ 103 50 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK MOMENT ABOUT Y AXIS

TRC INC TRUCK INTO STATIONARY CAR TEST NUMBER 930810

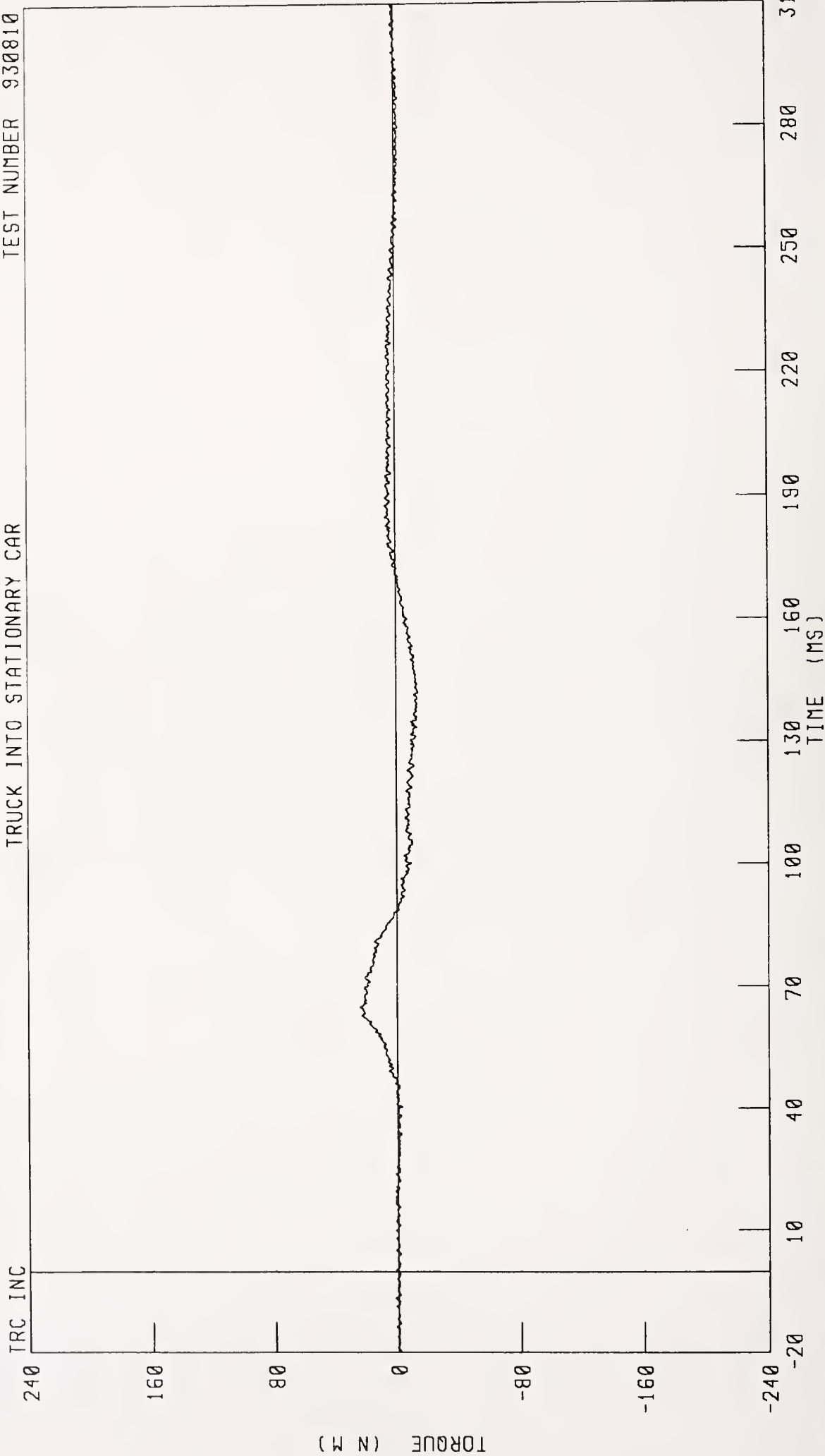


CHANNEL NEYM1 FILTER: CH CLASS 600

PEAK DATA 70 92 N M @ 99 00 MS, -119 51 N M @ 64 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK MOMENT ABOUT Z AXIS
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

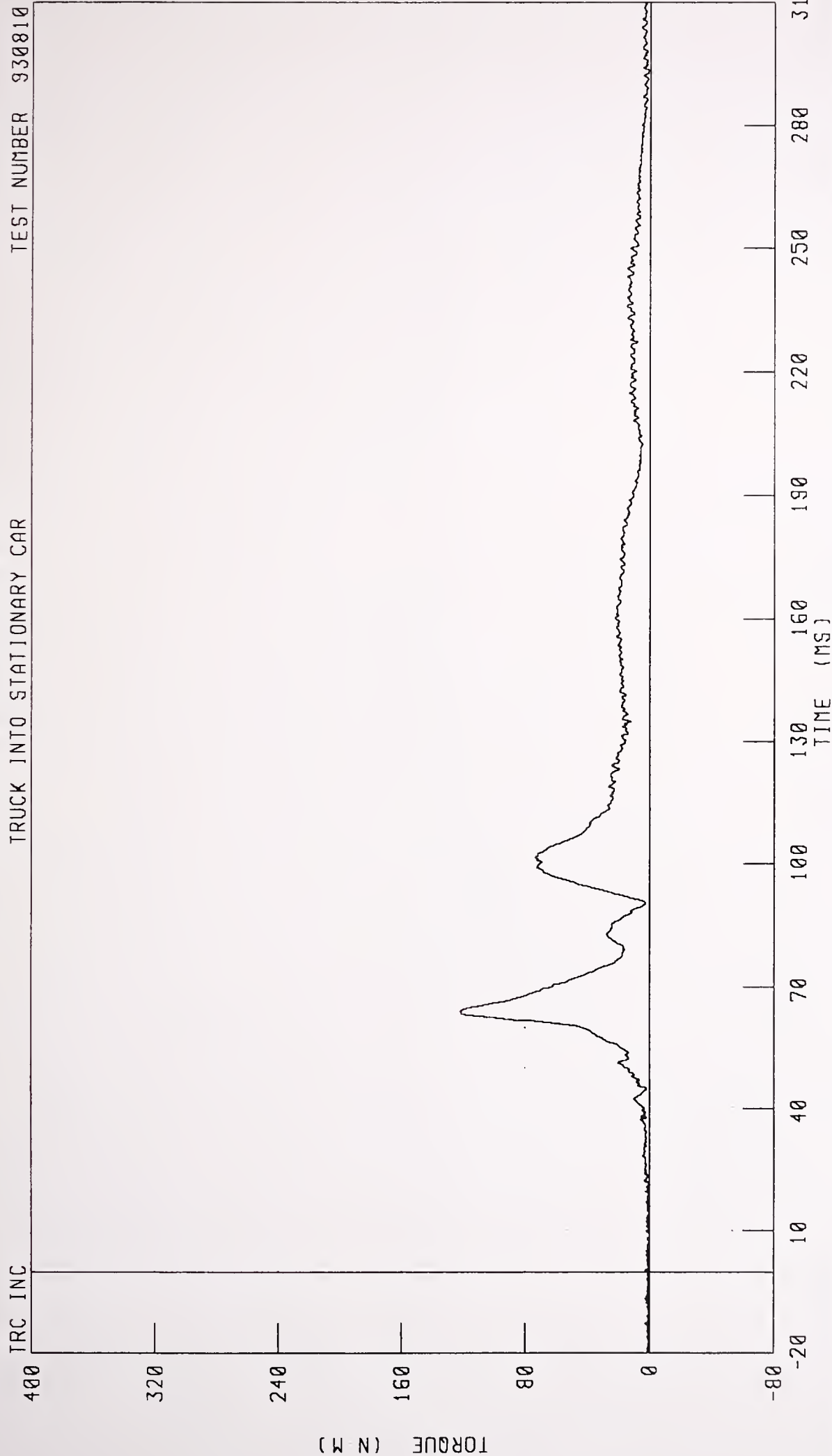


CHANNEL NEKZM1 FILTER CH CLASS 600

PEAK DATA 24 25 N M @ 65 00 MS, -14 38 N M @ 142 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER NECK MOMENT RESULTANT
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

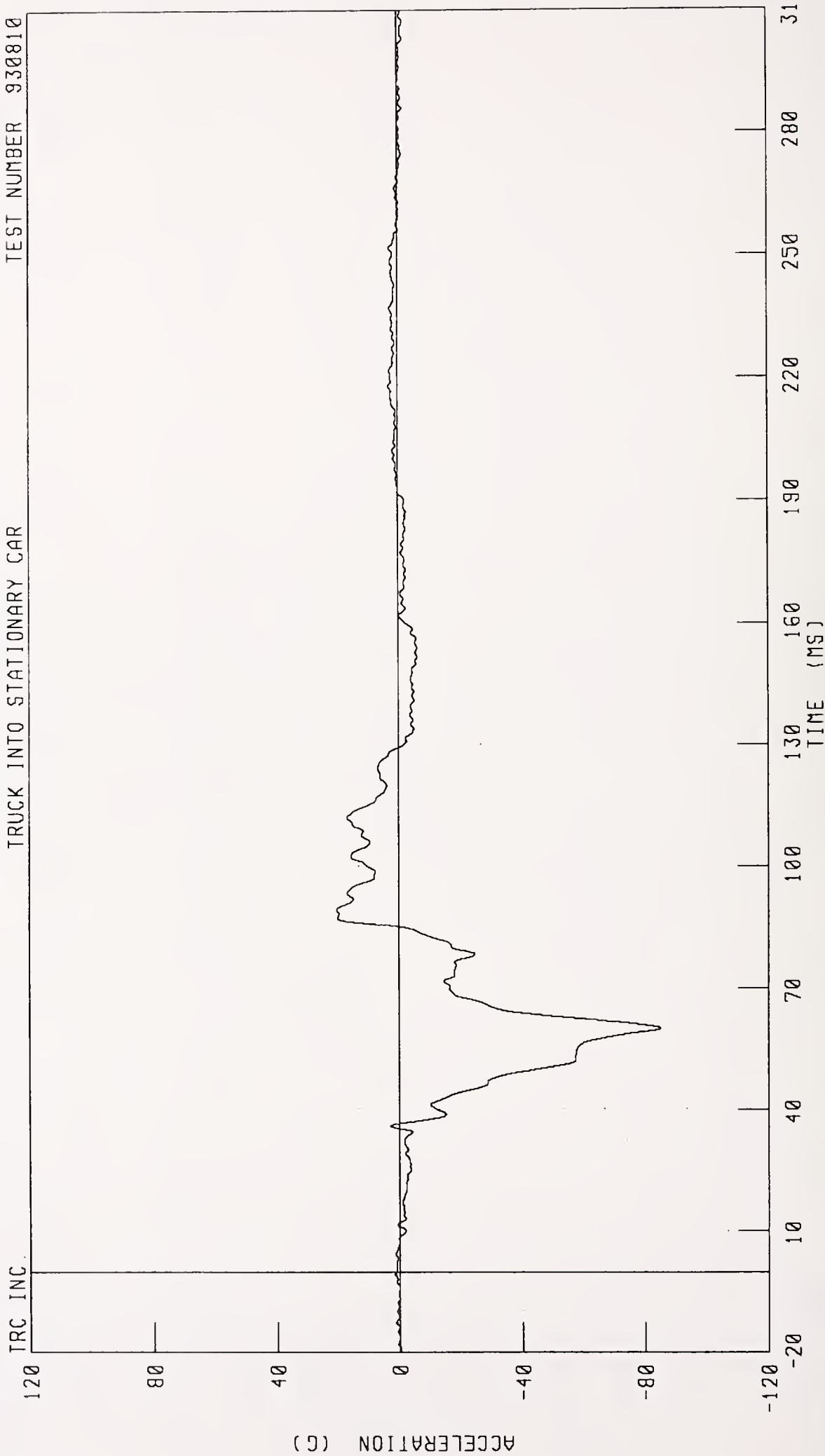


CHANNEL NEKM1 FILTER: CH CLASS 600

PEAK DATA 122 43 N M @ 64 00 MS, 0 07 N M @ 8 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 DRIVER CHEST X-AXIS ACCELERATION
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



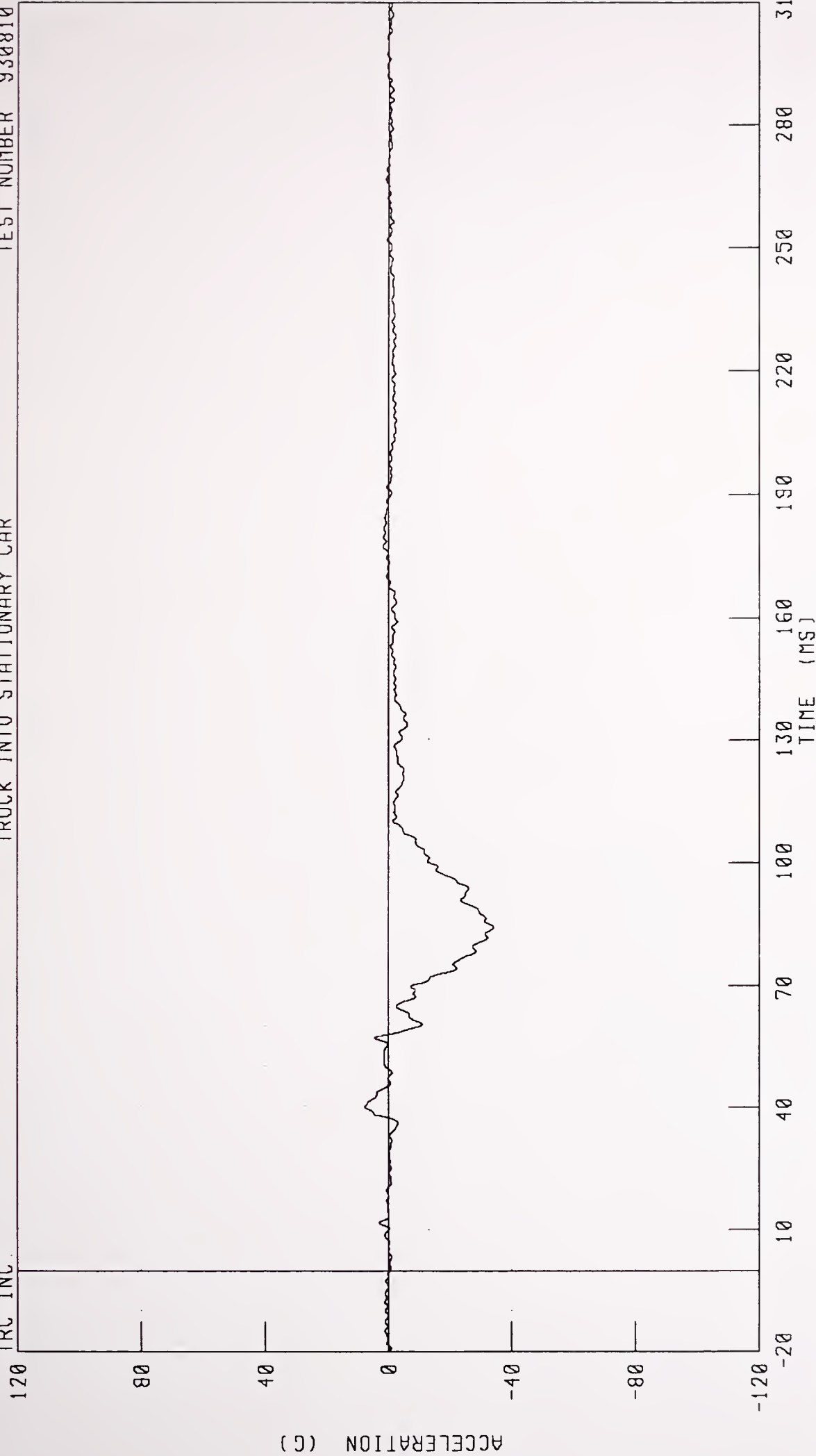
CHANNEL: CSTXG1 FILTER: CH CLASS 180

PEAK DATA 20 35 G @ 89 38 MS, -85 05 G @ 60 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER CHEST Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC.

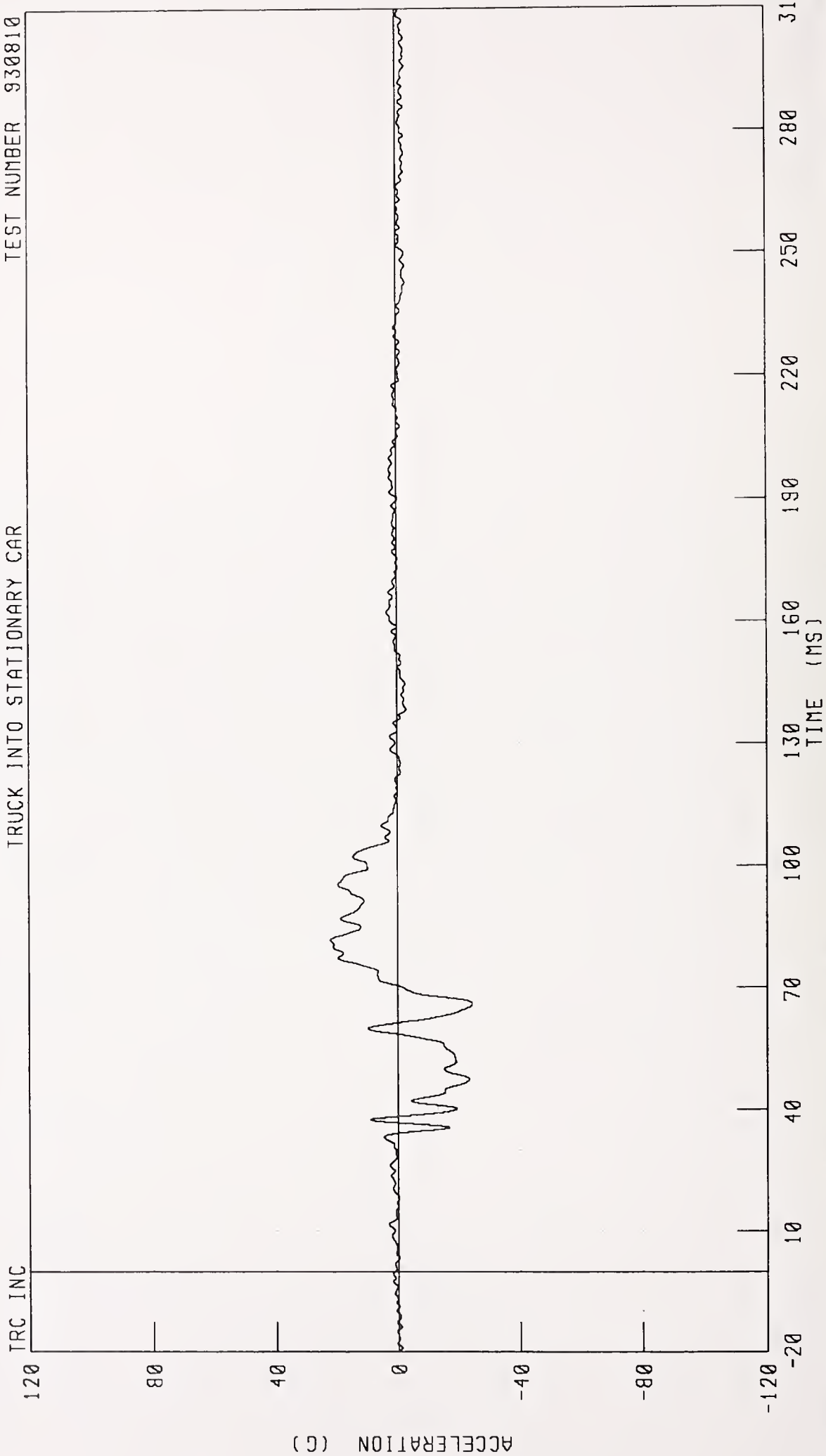


CHANNEL: CSTYG1 FILTER: CH CLASS 180

PEAK DATA 7 66 G @ 40 13 MS, -34 14 G @ 84 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 DRIVER CHEST Z-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR TEST NUMBER 930810

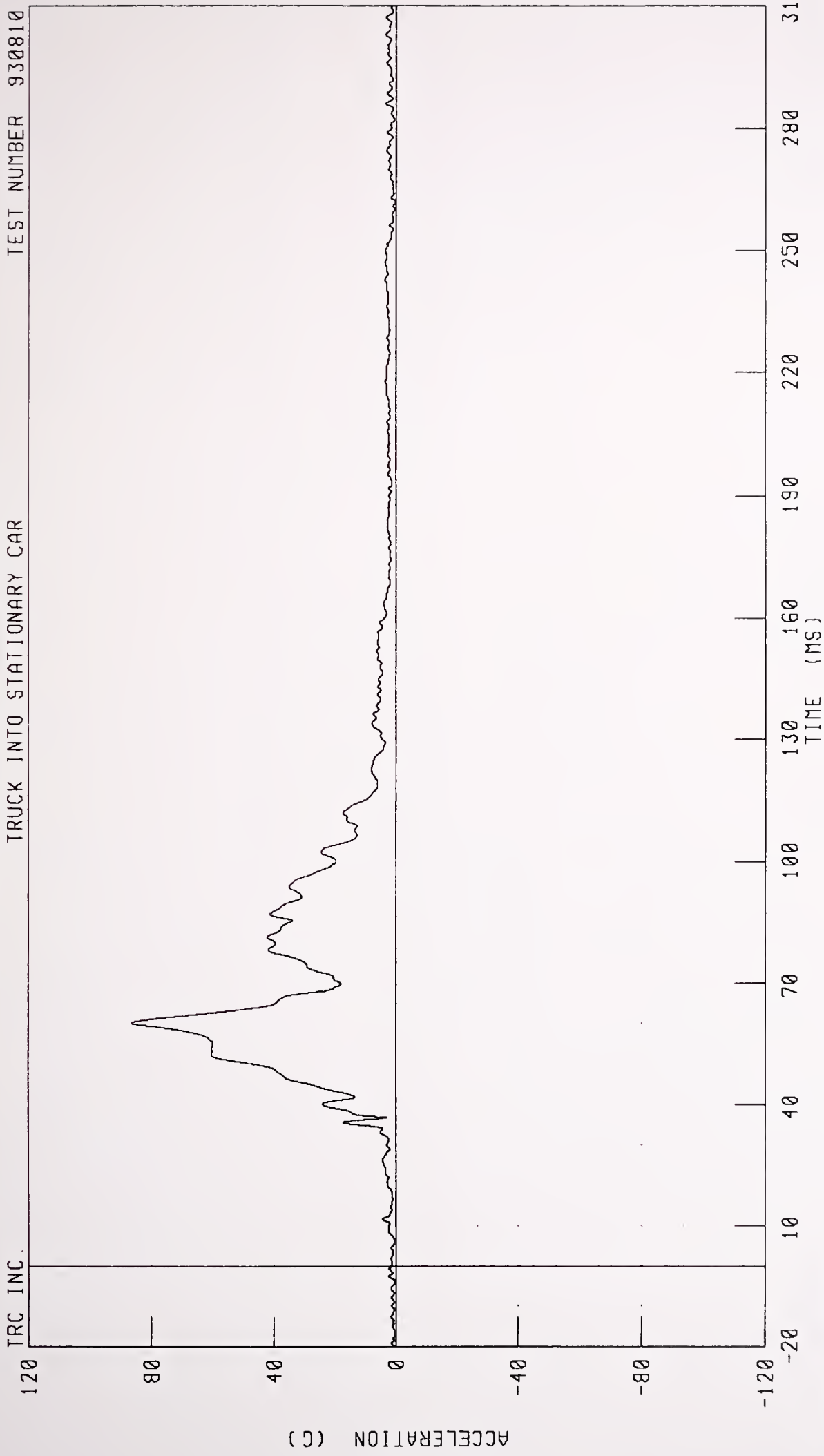


CHANNEL: CSTZG1 FILTER: CH CLASS 180

PEAK DATA 22 23 G @ 81 75 MS, -24.47 G @ 65.88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER CHEST RESULTANT ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



CHANNEL CSTRG1 FILTER CH CLASS 180

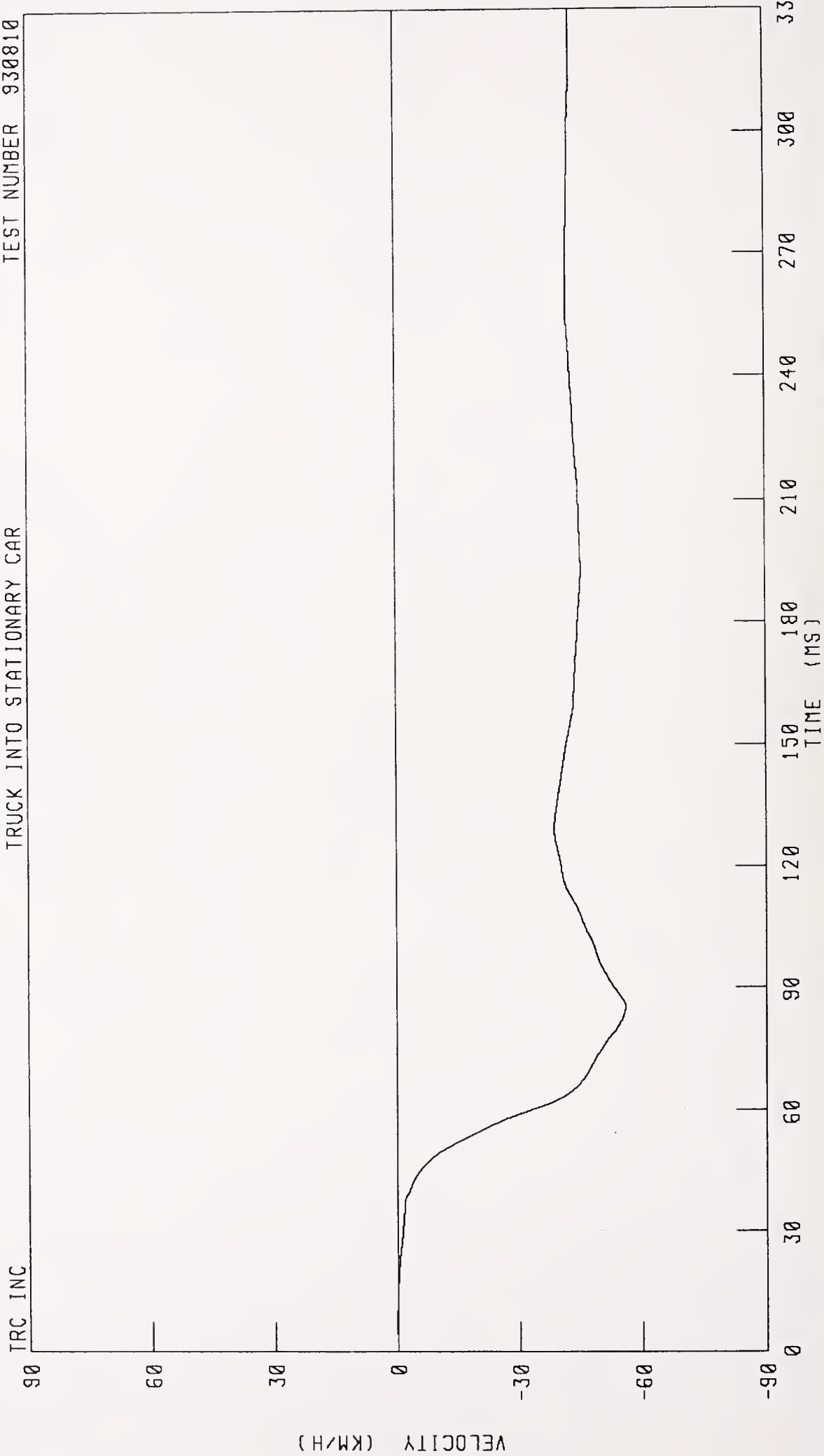
PEAK DATA 86 29 G @ 60 00 MS, 0 14 G @ 261 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER CHEST X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

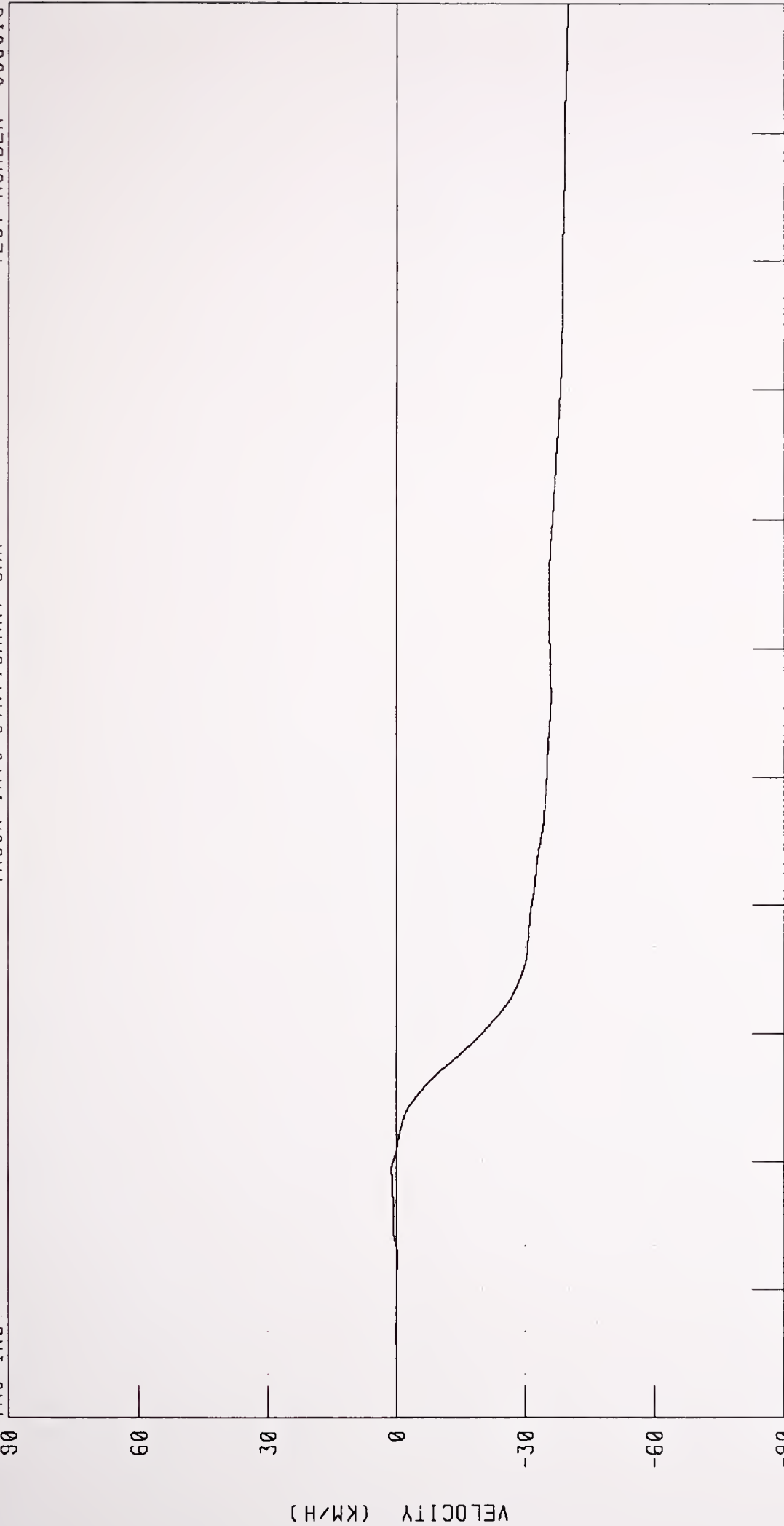


CHANNEL: CSTXV1 FILTER: CH CLASS 180

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER CHEST Y-AXIS VELOCITY
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



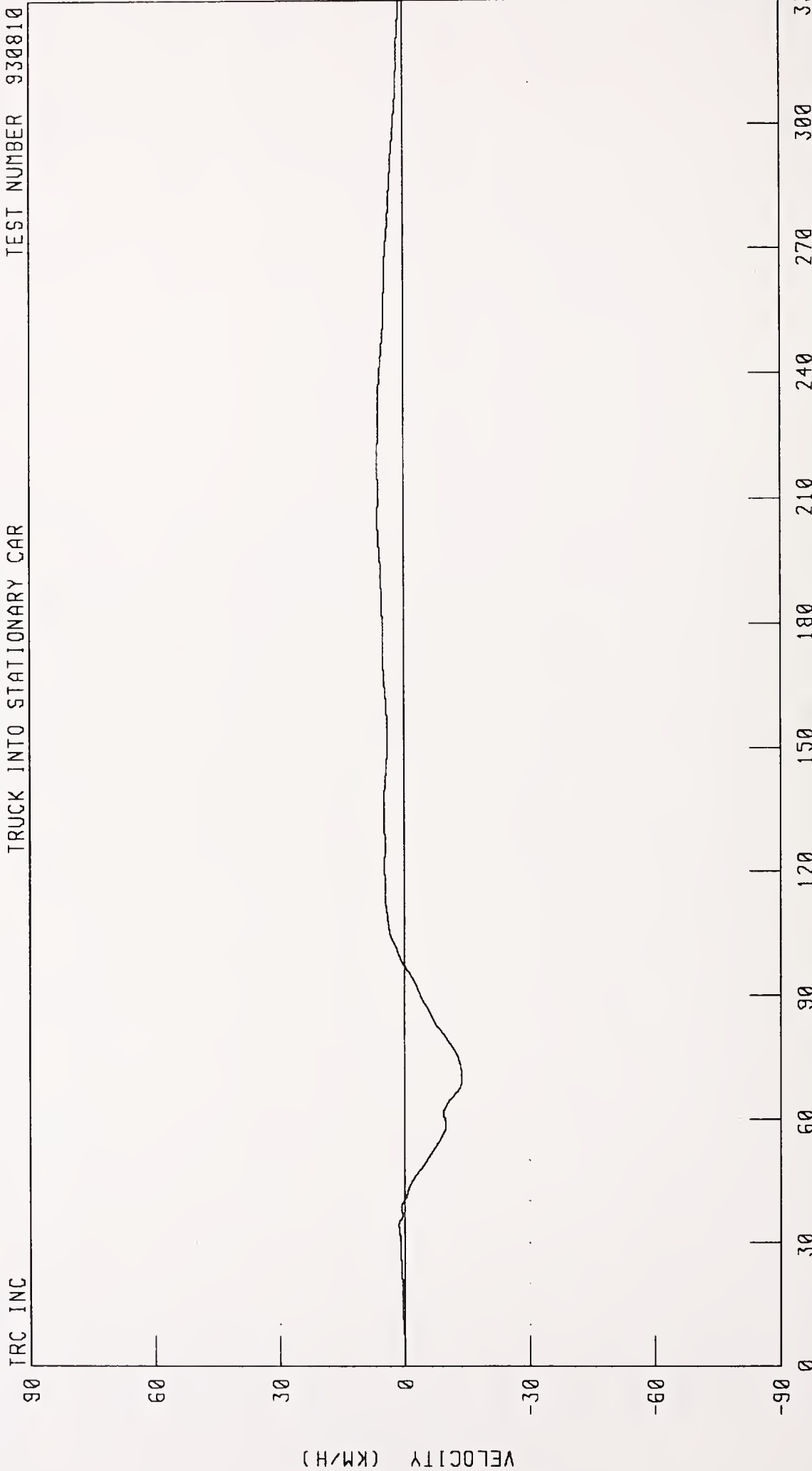
CHANNEL CSTYV1 FILTER CH CLASS 180
PEAK DATA 1 26 KM/H @ 57 88 MS, -39 84 KM/H @ 328 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER CHEST Z-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



TIME (MS)

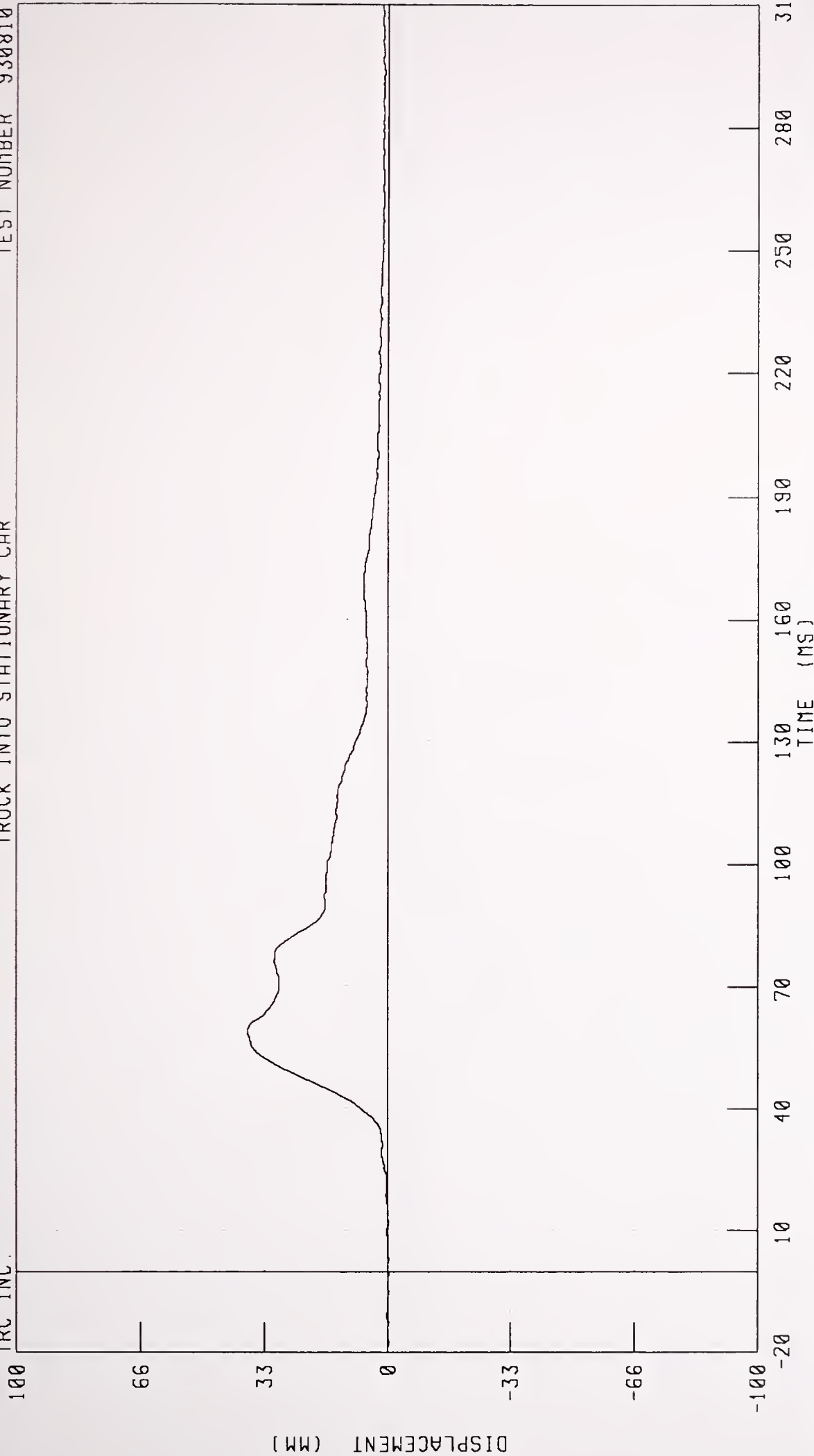
CHANNEL CSTZV1 FILTER CH CLASS 180

PEAK DATA 6 36 KM/H @ 218 50 MS, -13 81 KM/H @ 70 50 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER CHEST DEFLECTION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC.

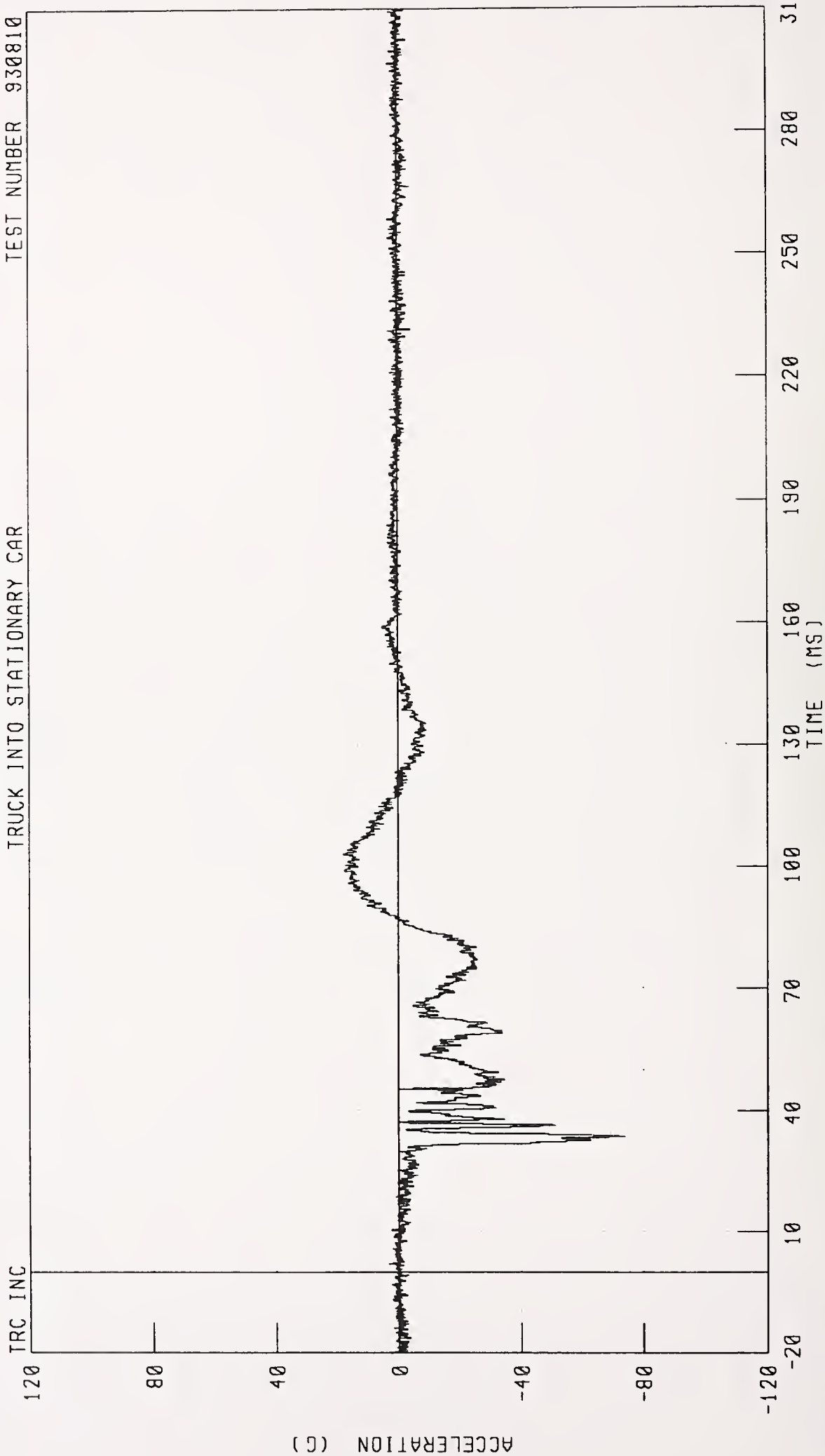


CHANNEL: CSTXD1 FILTER CH CLASS 180

PEAK DATA 37 81 MM @ 59 00 MS, -0 28 MM @ 11 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 DRIVER PELVIS X-AXIS ACCELERATION
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

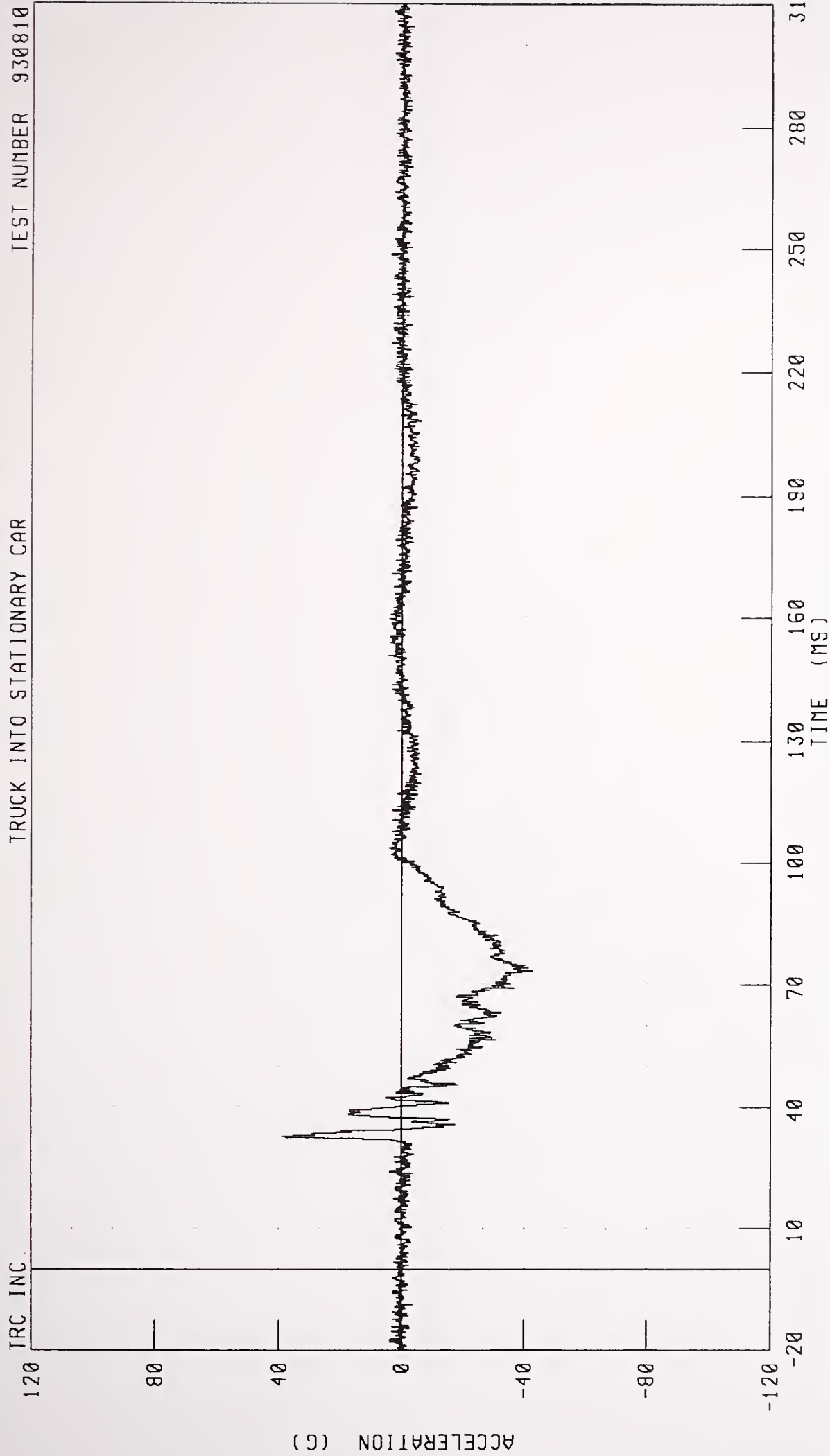


CHANNEL: PEVXG1 FILTER: CH CLASS 1000

PEAK DATA 17 88 G @ 103 13 MS, -73 81 G @ 33 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER PELVIS Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

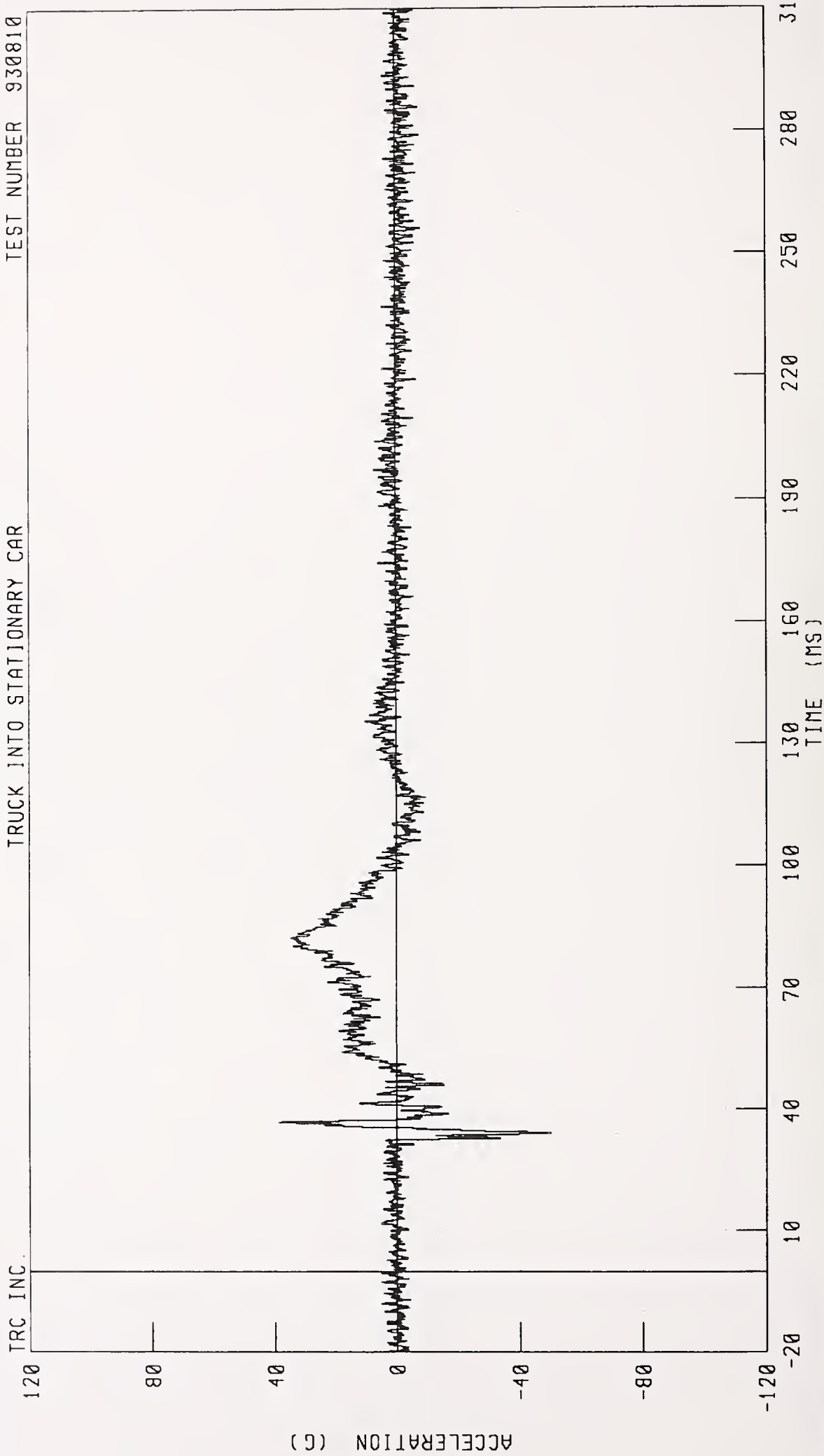


CHANNEL PEVYG1 FILTER CH CLASS 1000

PEAK DATA 38 93 G @ 32 88 MS, -42 72 G @ 73 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 DRIVER PELVIS Z-AXIS ACCELERATION
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

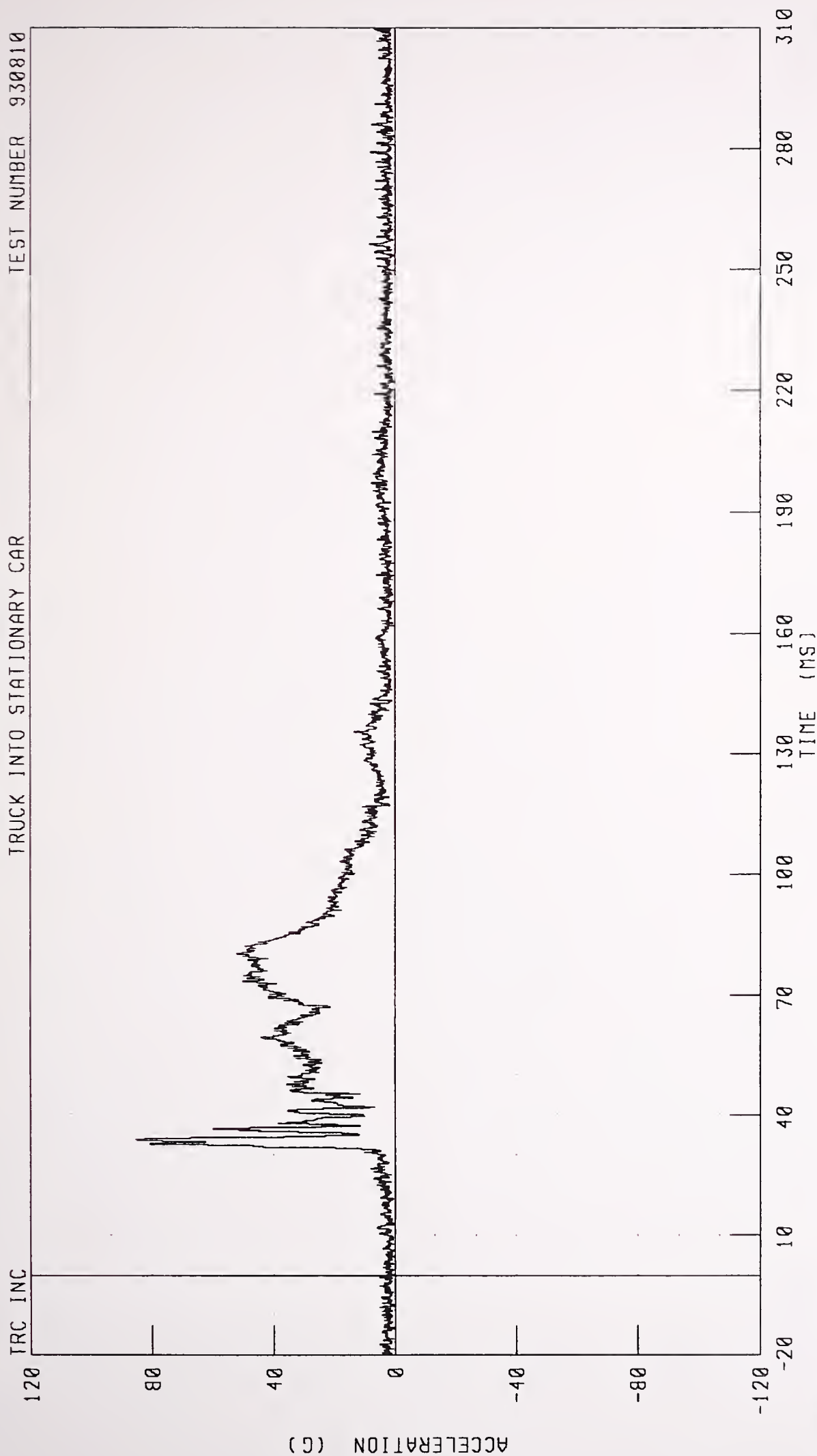


CHANNEL PEVZG1 FILTER CH CLASS 1000

PEAK DATA 38 80 G @ 36 63 MS, -49 99 G @ 33 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER PELVIS RESULTANT ACCELERATION

TRUCK INTO STATIONARY CAR TEST NUMBER 930810



CHANNEL: PEVRG1 FILTER: CH. CLASS 1000

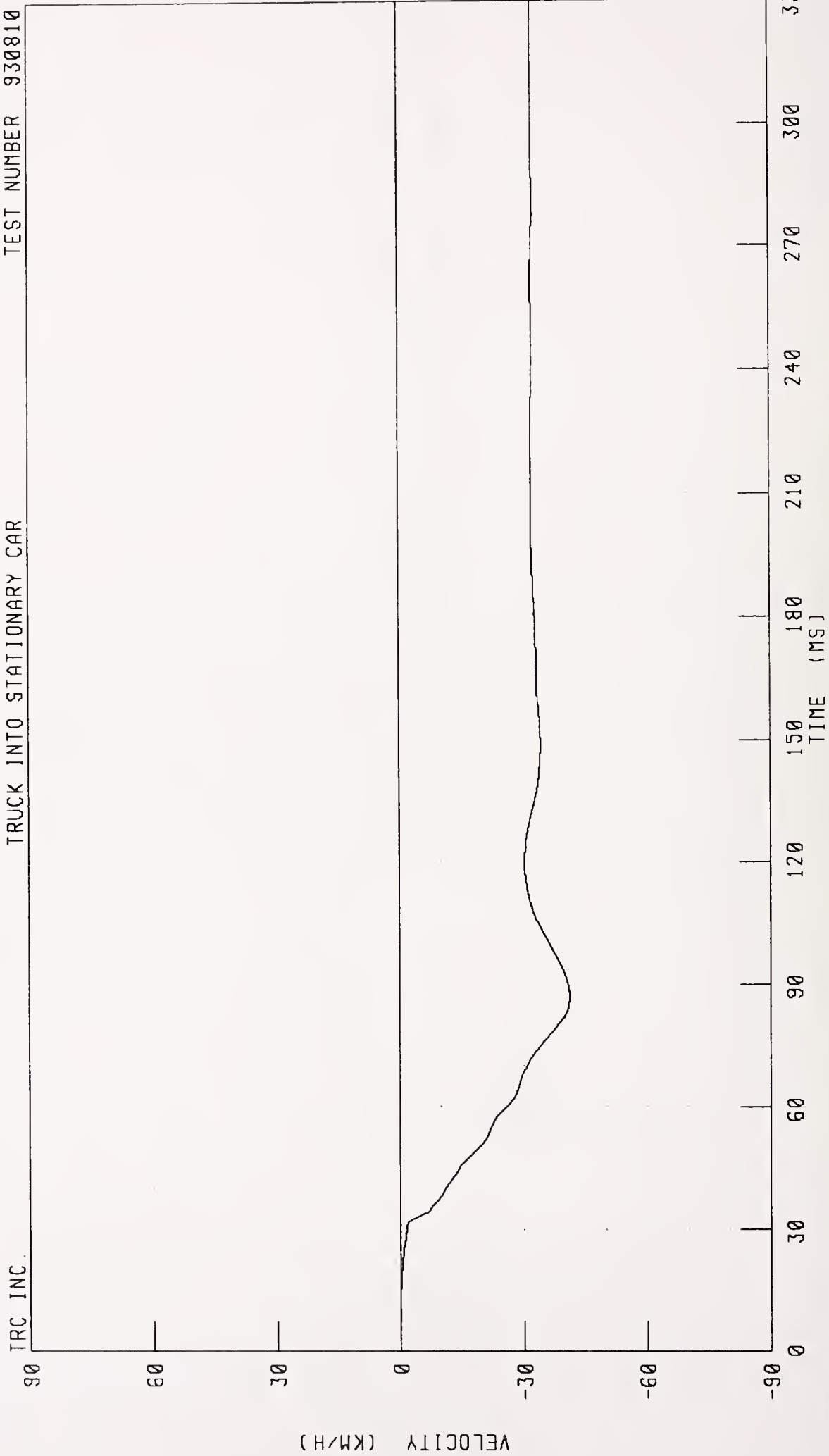
PEAK DATA 85 42 G @ 33 88 MS, 0 16 G @ 249 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER PELVIS X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



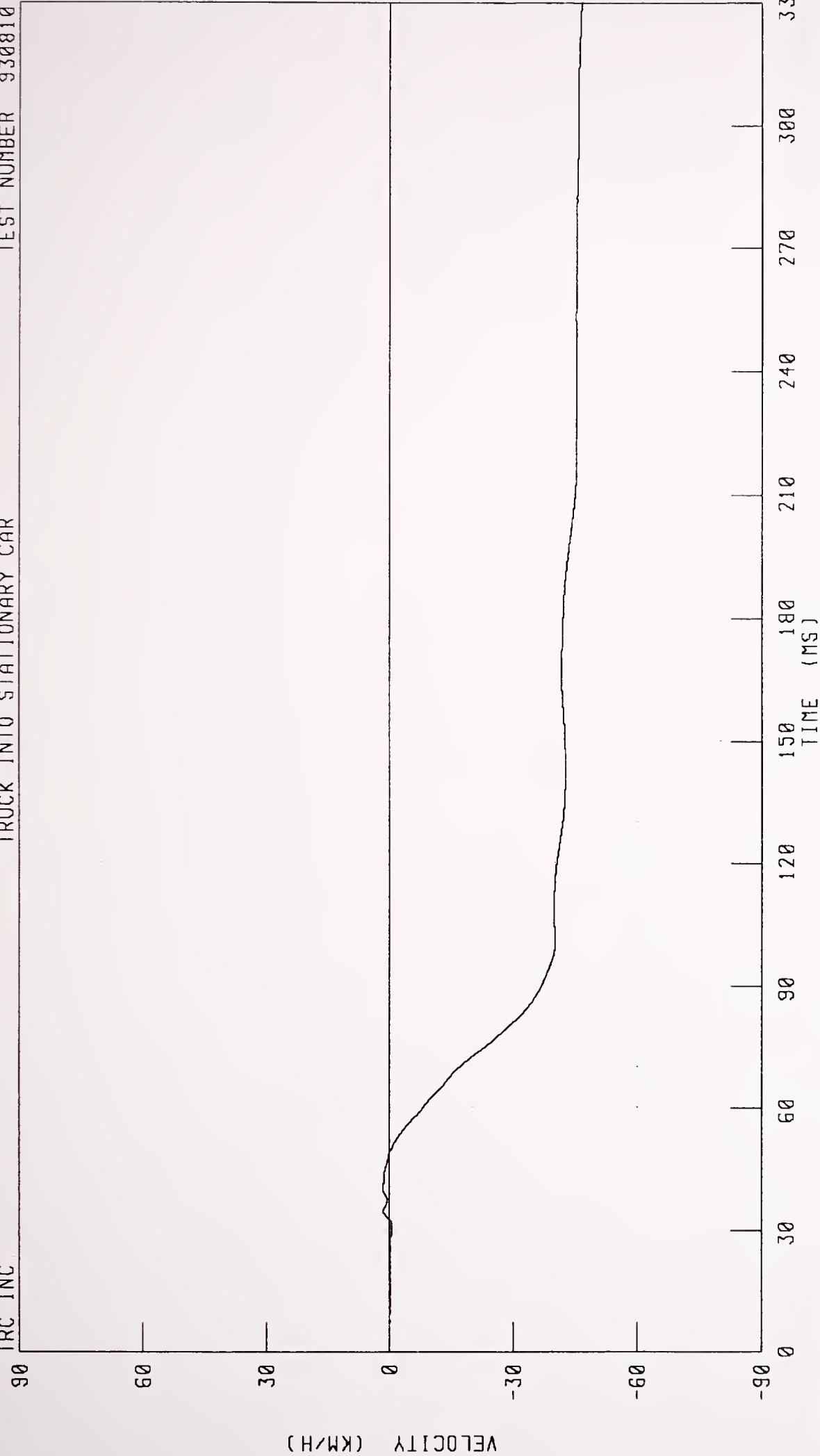
CHANNEL: PEVXV1 FILTER CH CLASS 180

PEAK DATA 0 10 KM/H @ 9 75 MS, -41 07 KM/H @ 87 25 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER PELVIS Y-AXIS VELOCITY
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL PEYV1 FILTER CH CLASS 180

PEAK DATA 1 64 KM/H @ 40 25 MS, -46 42 KM/H @ 330 00 MS

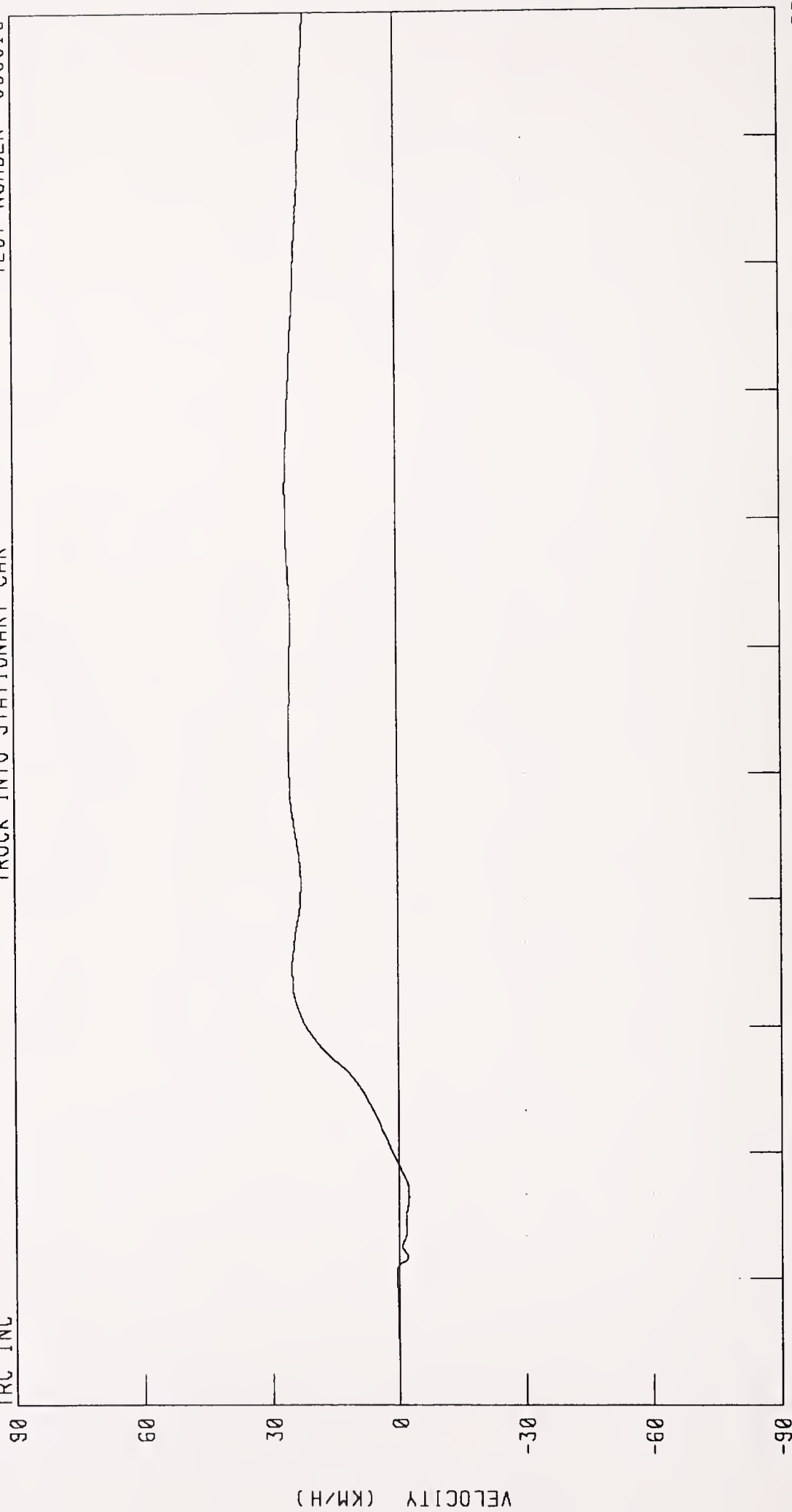
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER PELVIS Z-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL PEVZV1 FILTER CH CLASS 180

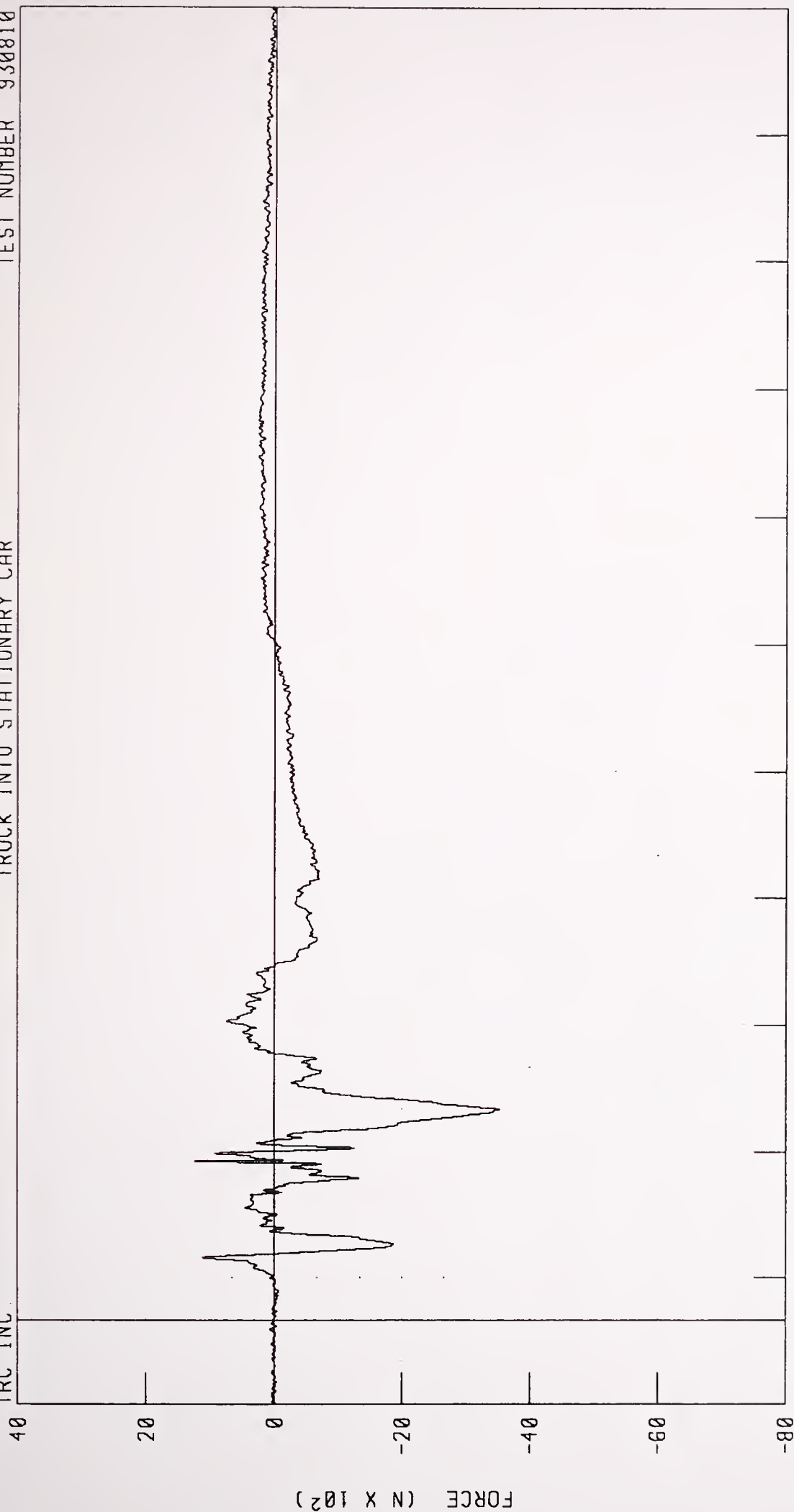
PEAK DATA

26 33 KM/H @ 218 38 MS, -2 40 KM/H @ 49 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
DRIVER LEFT FEMUR FORCE
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

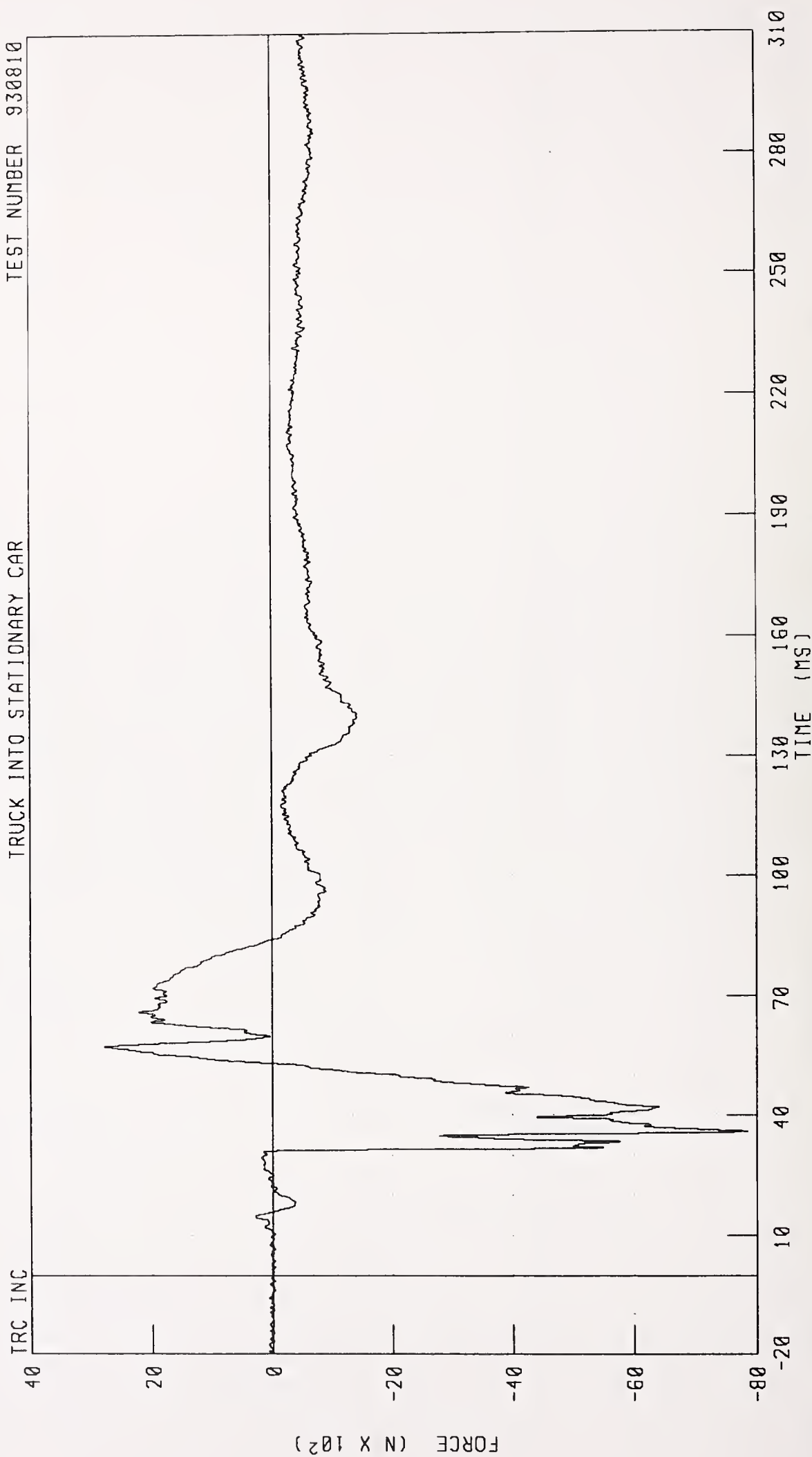
TRC INC



CHANNEL LFMF1 FILTER CH CLASS 600
PEAK DATA 1227 55 N @ 37 75 MS, -3521 45 N @ 50 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 DRIVER RIGHT FEMUR FORCE
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



CHANNEL RFMF1 FILTER: CH. CLASS 600

PEAK DATA 2784 19 N @ 57 38 MS, -7843 23 N @ 35 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER LAP BELT OUTBOARD FORCE

TRUCK INTO STATIONARY CAR

TRC INC

TEST NUMBER 930810



CHANNEL LBOFI FILTER CH CLASS 60

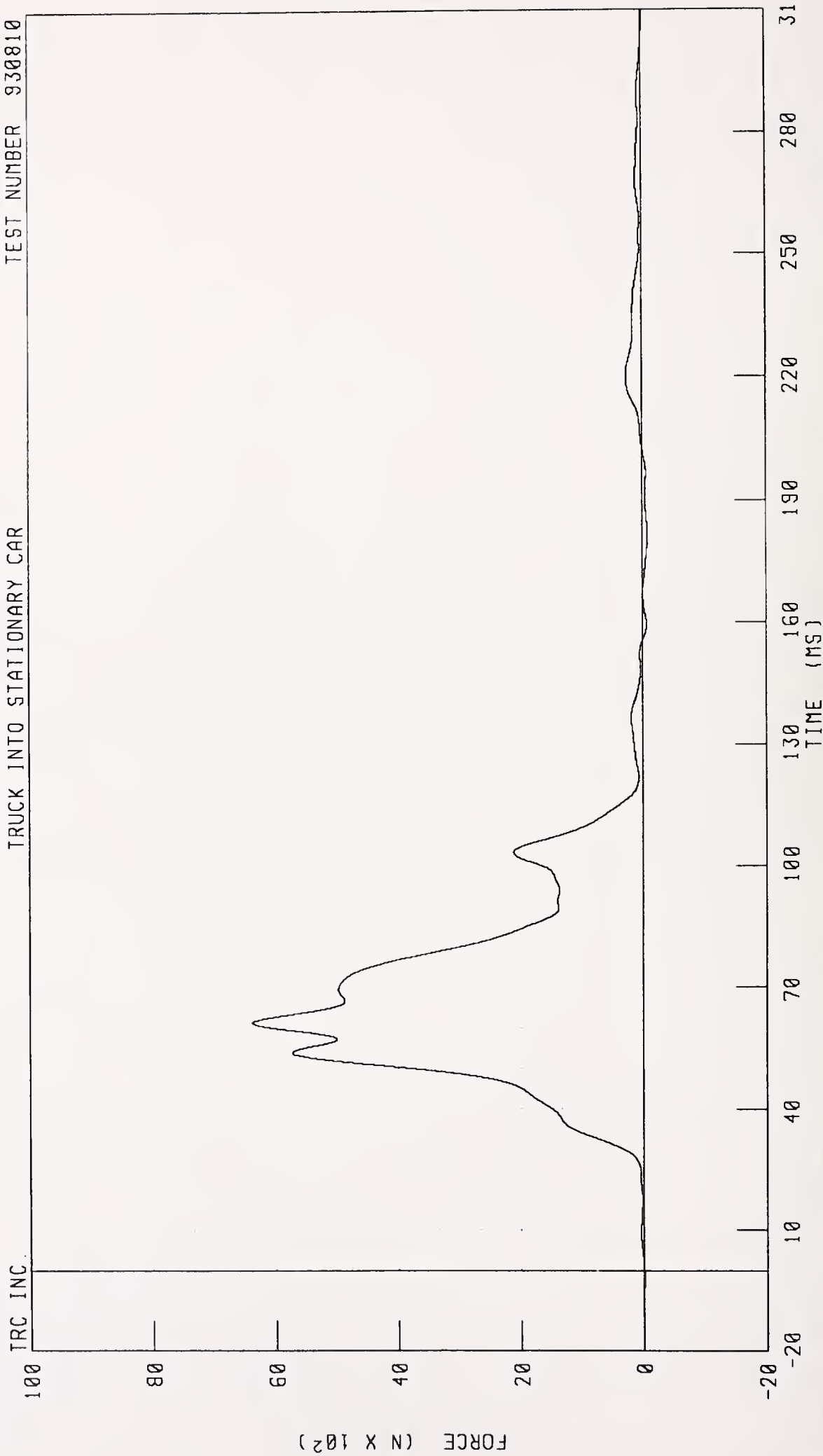
PEAK DATA 5927 49 N @ 54 38 MS, -15 98 N @ -17 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

DRIVER SHOULDER BELT FORCE

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

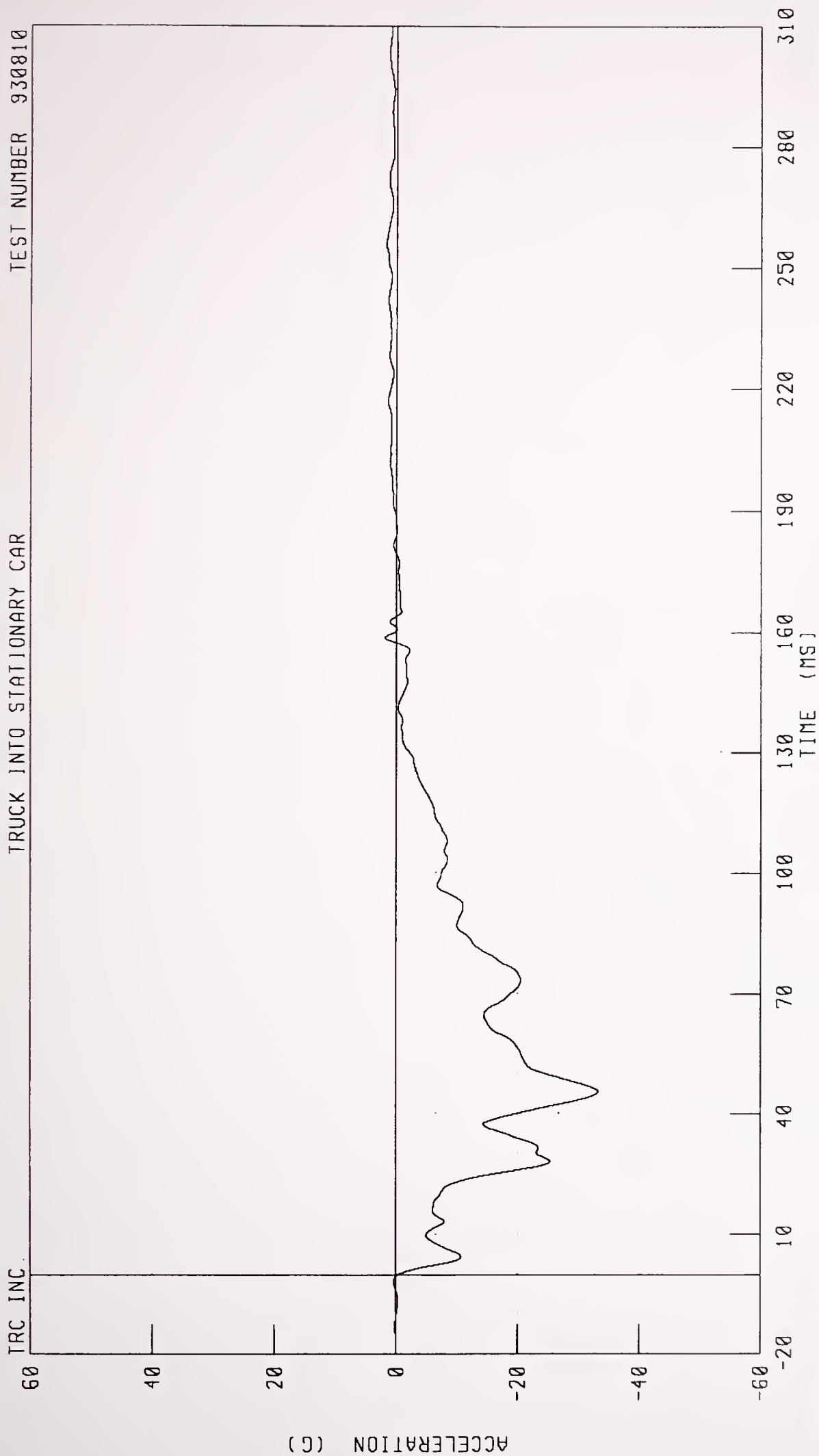


CHANNEL SHBF1 FILTER CH. CLASS 60

PEAK DATA 6381 54 N @ 61 25 MS, -81 79 N @ 181 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
LEFT REAR SEAT X-AXIS ACCELERATION

TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER 930810



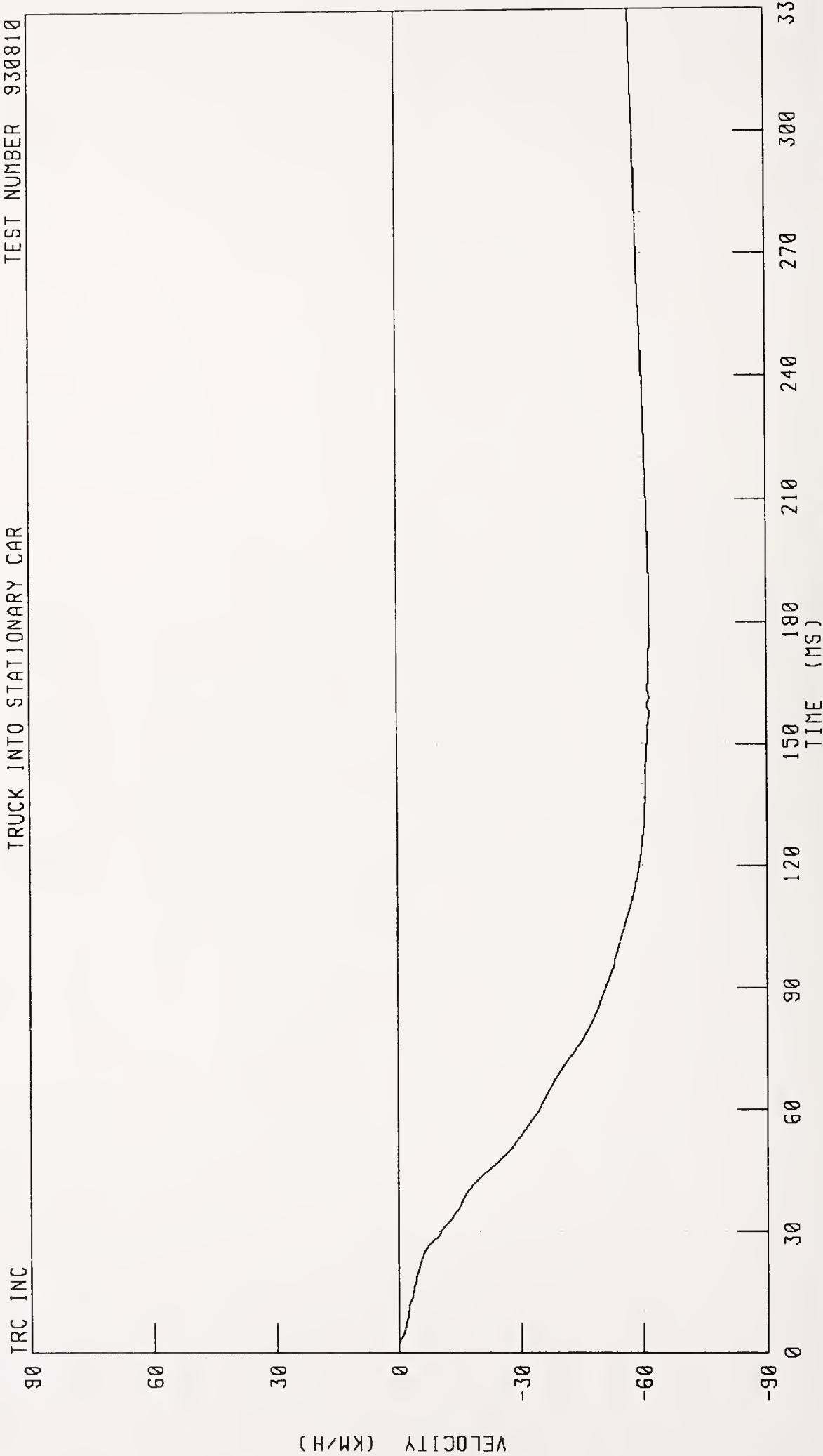
CHANNEL TLRXG1 FILTER CH. CLASS 60 PEAK DATA 1 83 G @ 158 63 MS, -33 15 G @ 45 50 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

LEFT REAR SEAT X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

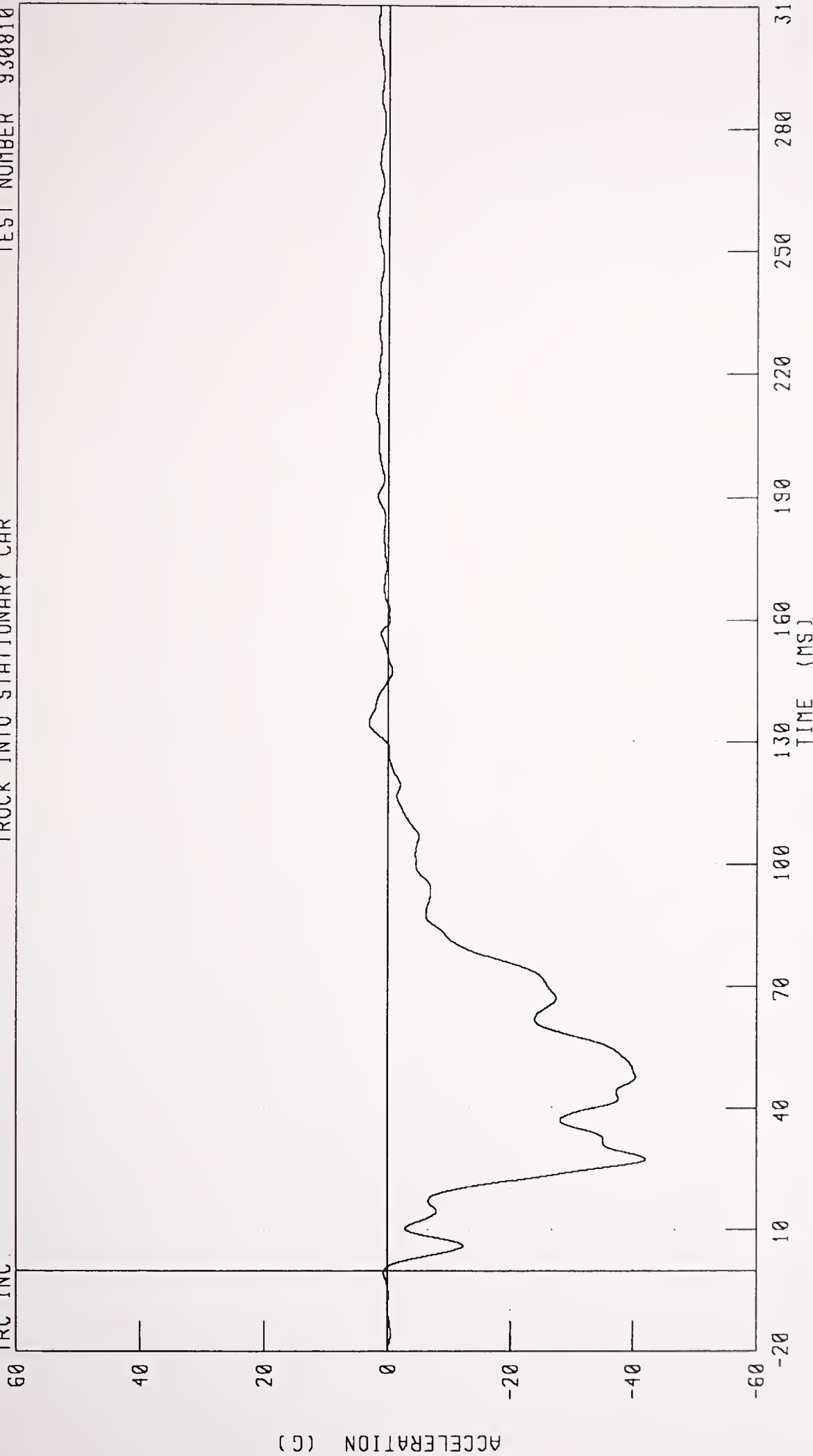
TEST NUMBER 930810



CHANNEL TLRXV1 FILTER CH CLASS 180

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER 930810



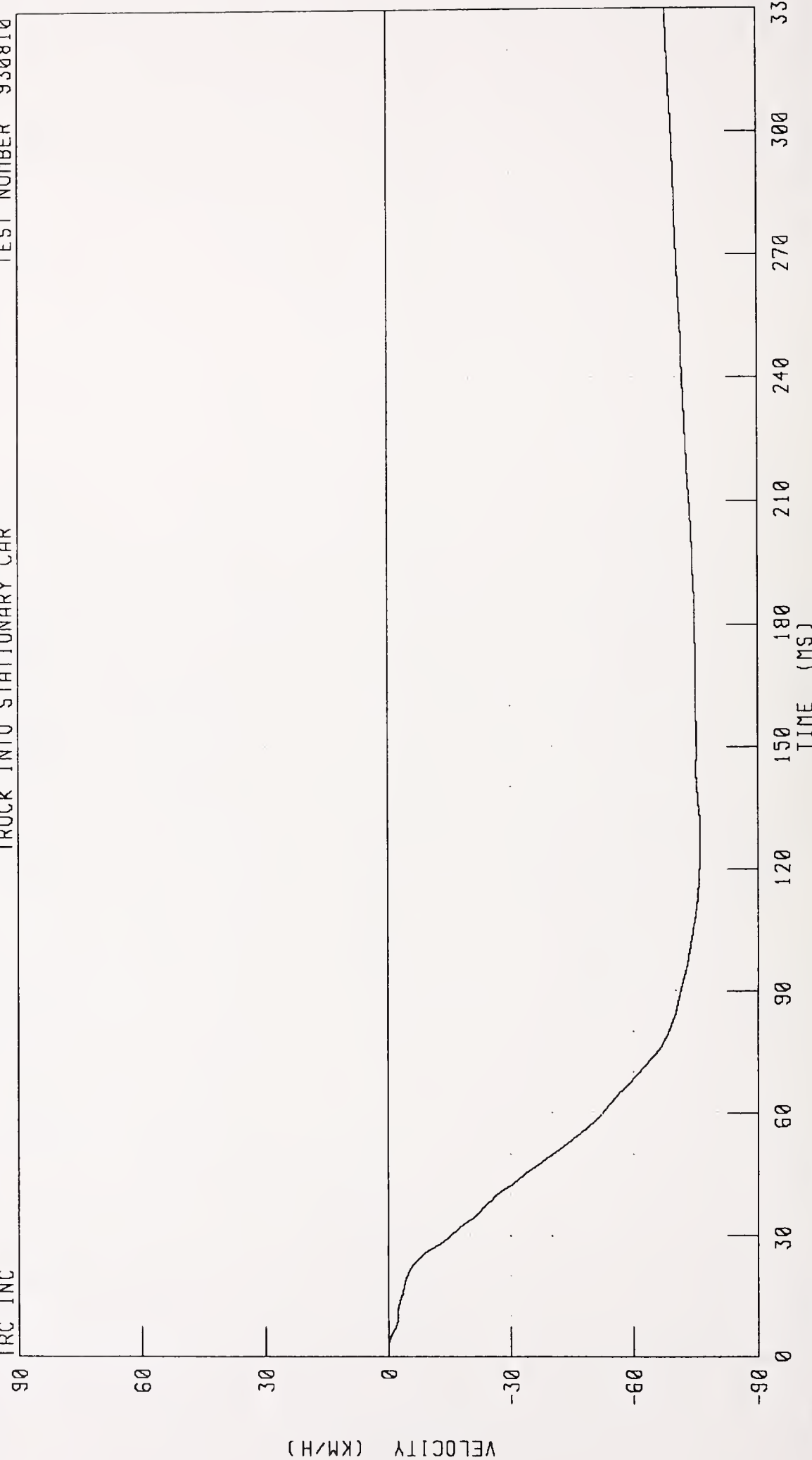
CHANNEL TRRXG1 FILTER CH CLASS 60

PEAK DATA 3 10 G @ 134 38 MS, -41 97 G @ 27 50 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 RIGHT REAR SEAT X-AXIS VELOCITY
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

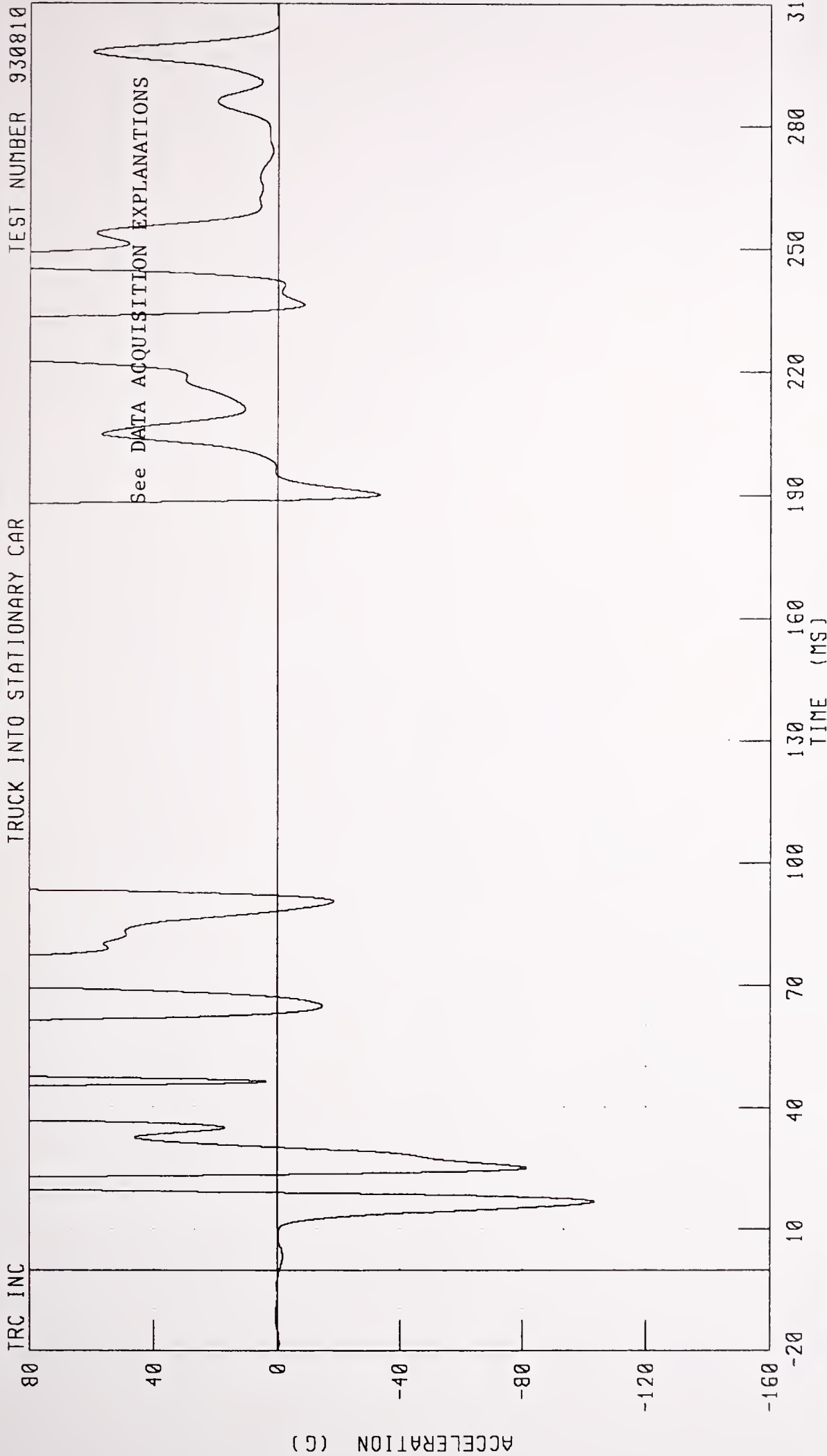
TRC INC



CHANNEL: TRRXV1 FILTER CH CLASS 180

PEAK DATA 0 02 KM/H @ 2 25 MS, -76 01 KM/H @ 130 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
ENGINE TOP X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR



CHANNEL ENGXC1 FILTER CH CLASS 60

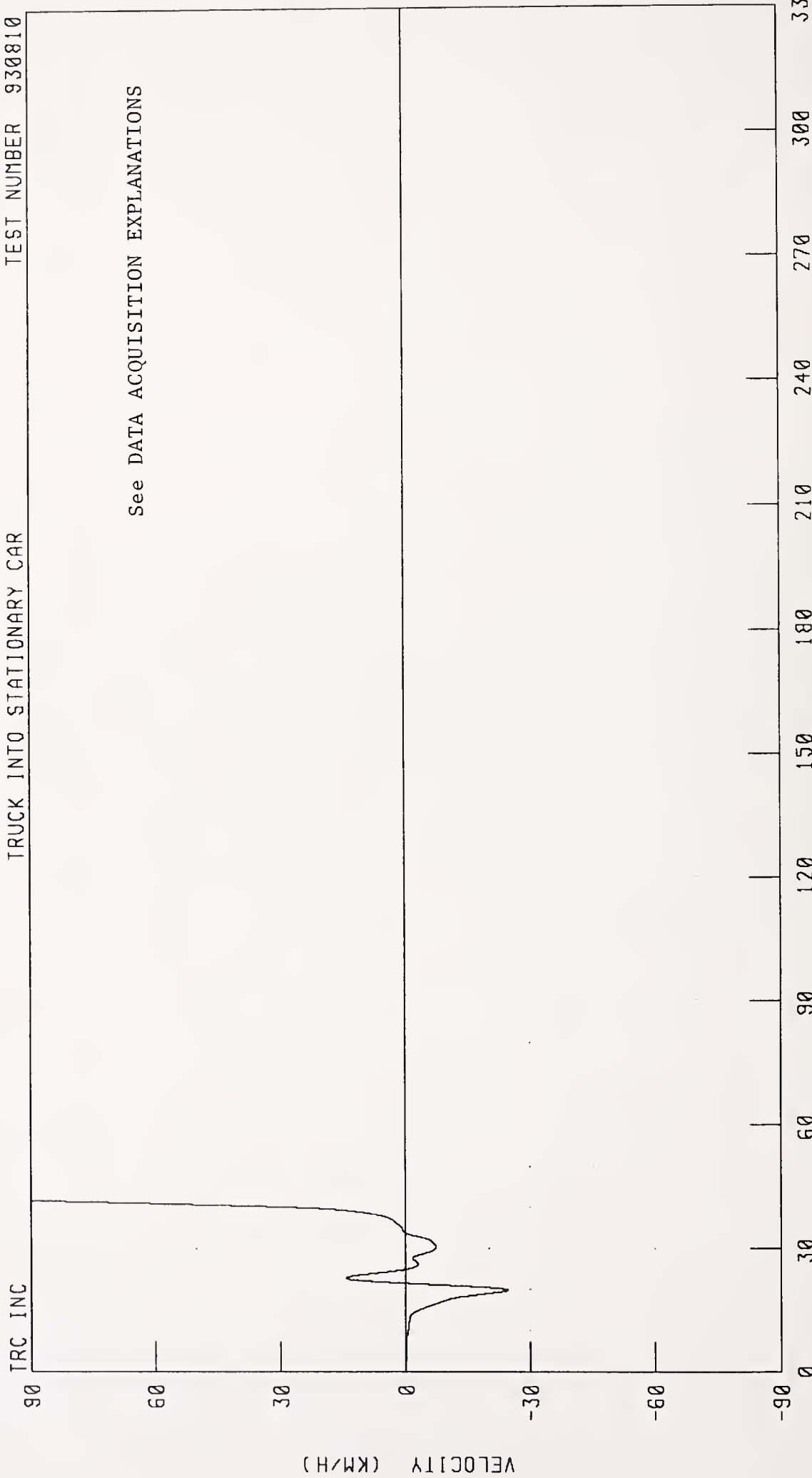
PEAK DATA 1159 61 G @ 107 88 MS, -103 44 G @ 16 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

ENGINE TOP X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



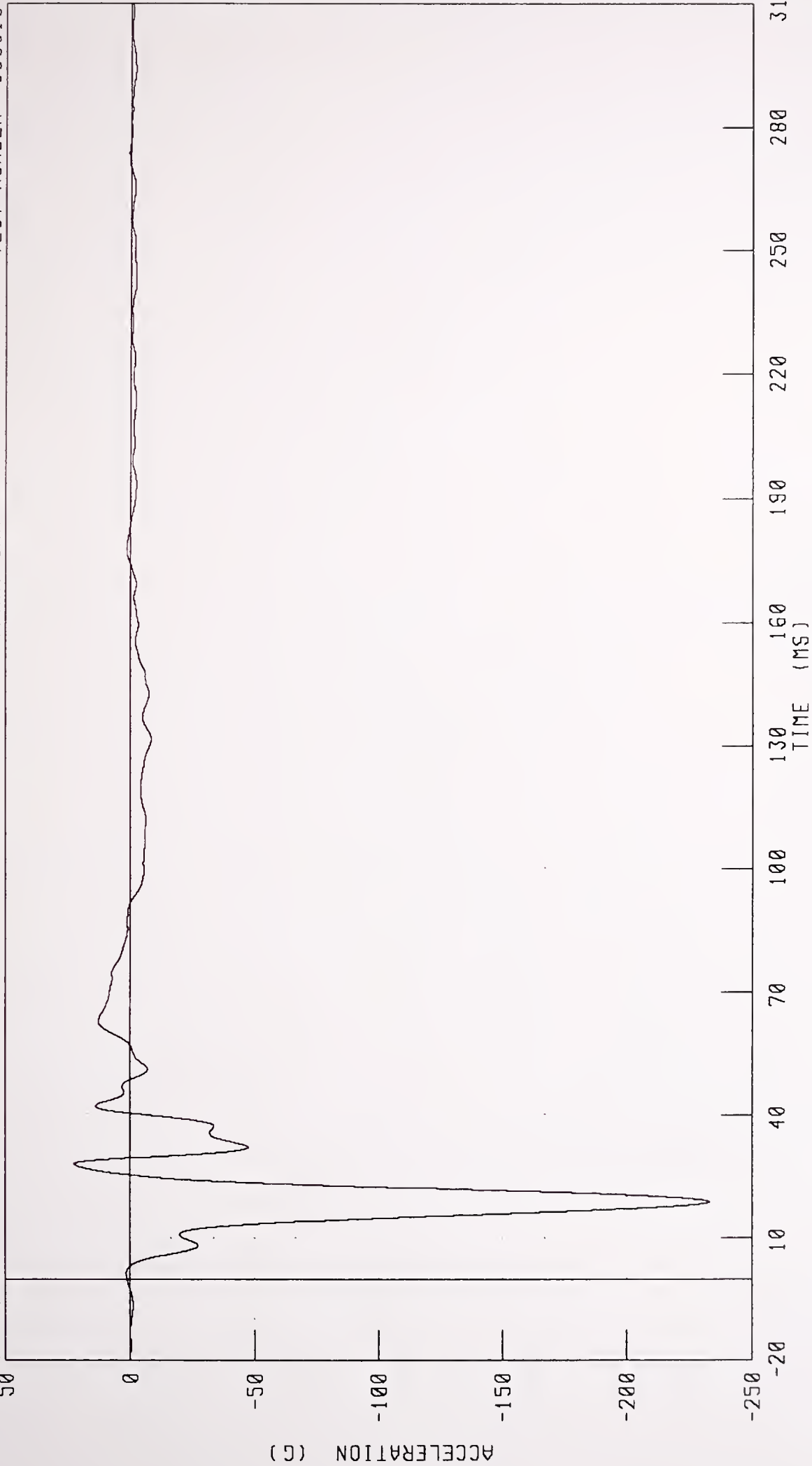
TIME (MS)

CHANNEL: ENGXV1 FILTER CH. CLASS 180 PEAK DATA 3343 41 KM/H @ 330 00 MS, -24 73 KM/H @ 19 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
ENGINE BOTTOM X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL: ENGCG2 FILTER: CH CLASS 60

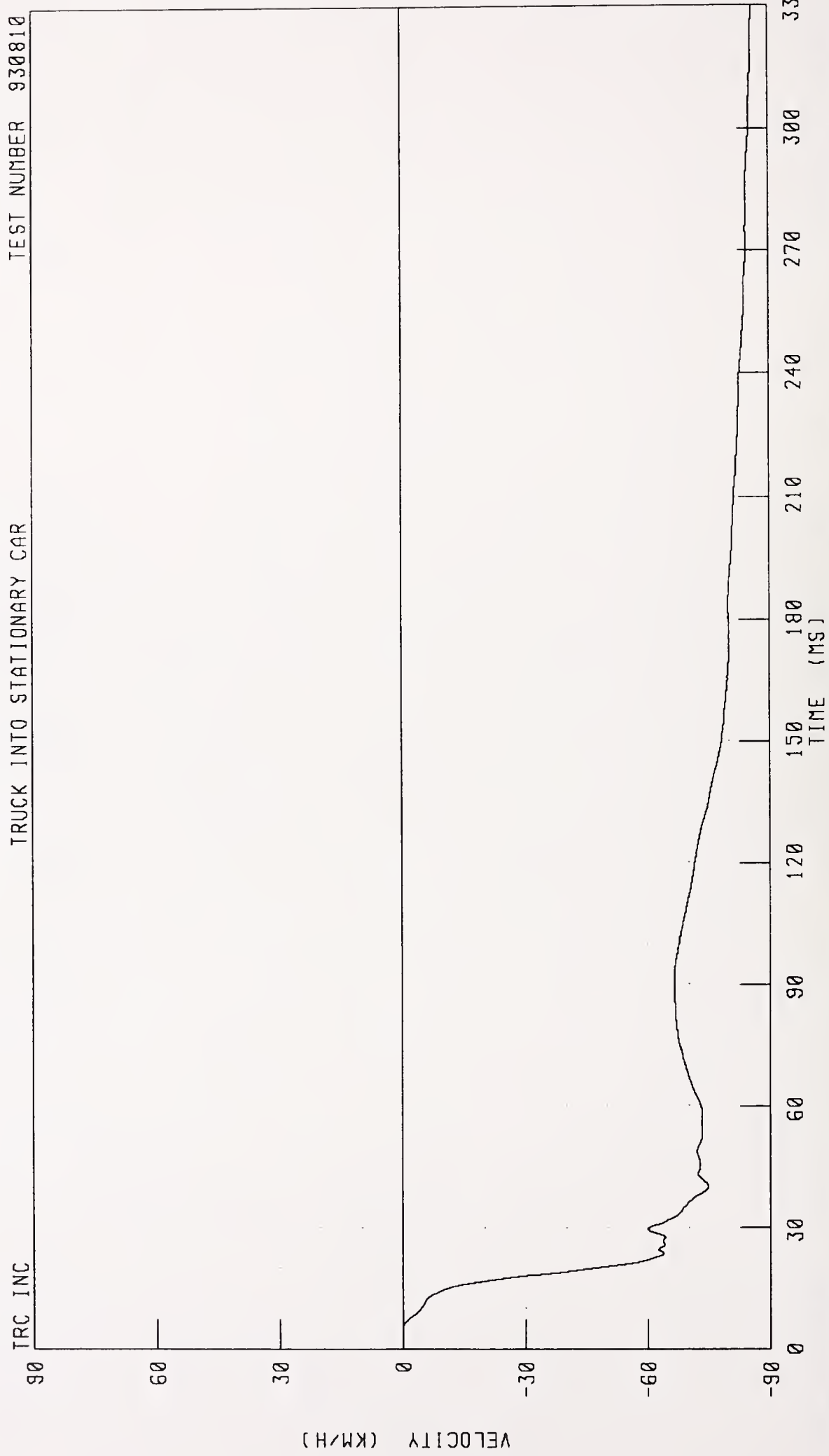
PEAK DATA 22 49 G @ 28 00 MS, -232 80 G @ 18 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

ENGINE BOTTOM X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

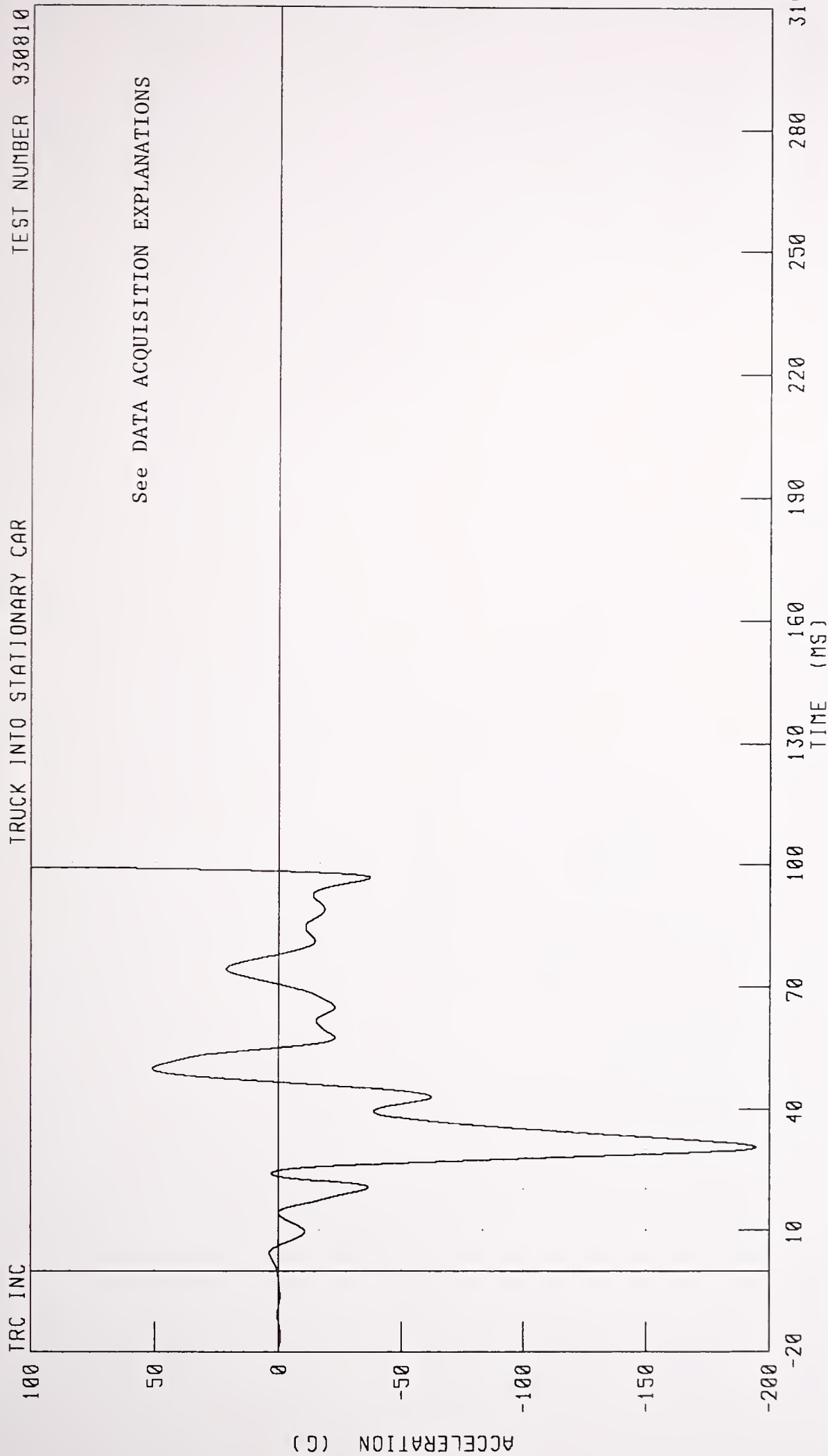


CHANNEL: ENGxV2 FILTER: CH. CLASS 180

PEAK DATA: 0.06 KM/H @ 2.63 MS, -85.81 KM/H @ 330.00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR
TEST NUMBER 930810



CHANNEL BCRXG1 FILTER CH CLASS 60
PEAK DATA 1166 19 G @ 130 63 MS, -194 55 G @ 30 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17

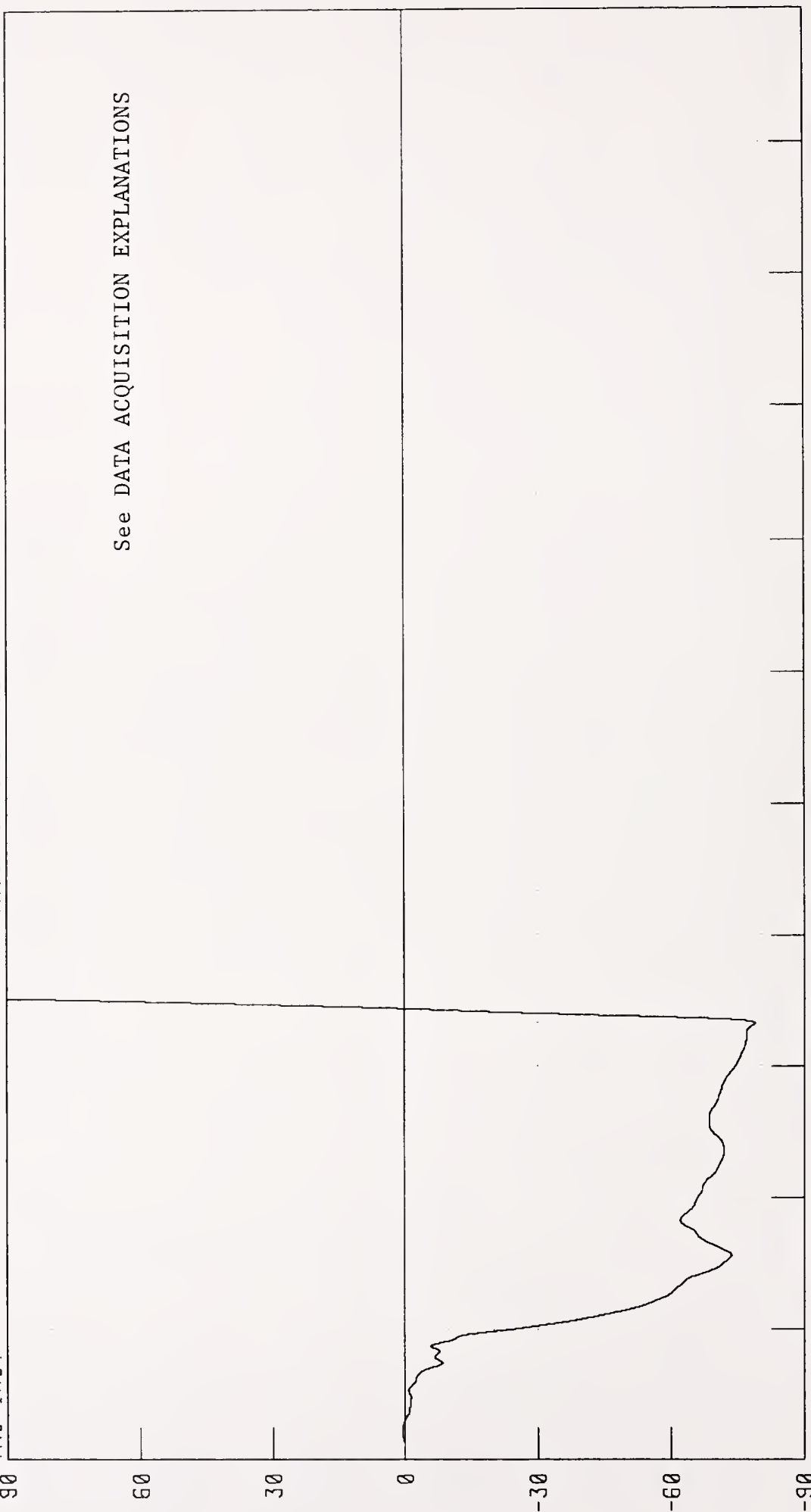
RIGHT BRAKE CALIPER X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR TEST NUMBER 930810

TRC INC.

See DATA ACQUISITION EXPLANATIONS

VELOCITY (KM/H)



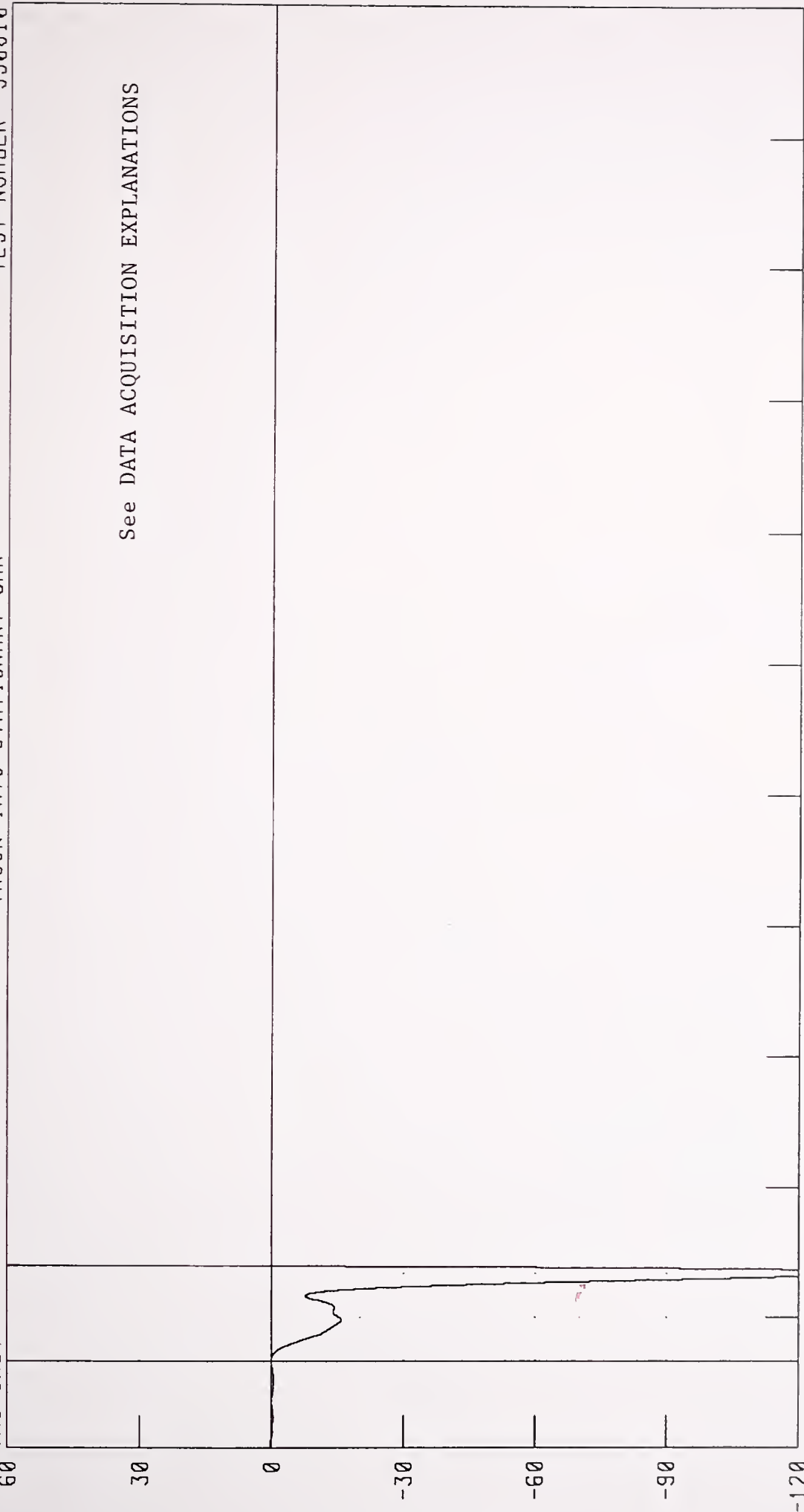
CHANNEL BCRXV1 FILTER CH CLASS 180

PEAK DATA 8960 66 KM/H @ 330 00 MS; -78 85 KM/H @ 99 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR
TEST NUMBER 930810

TRC INC.



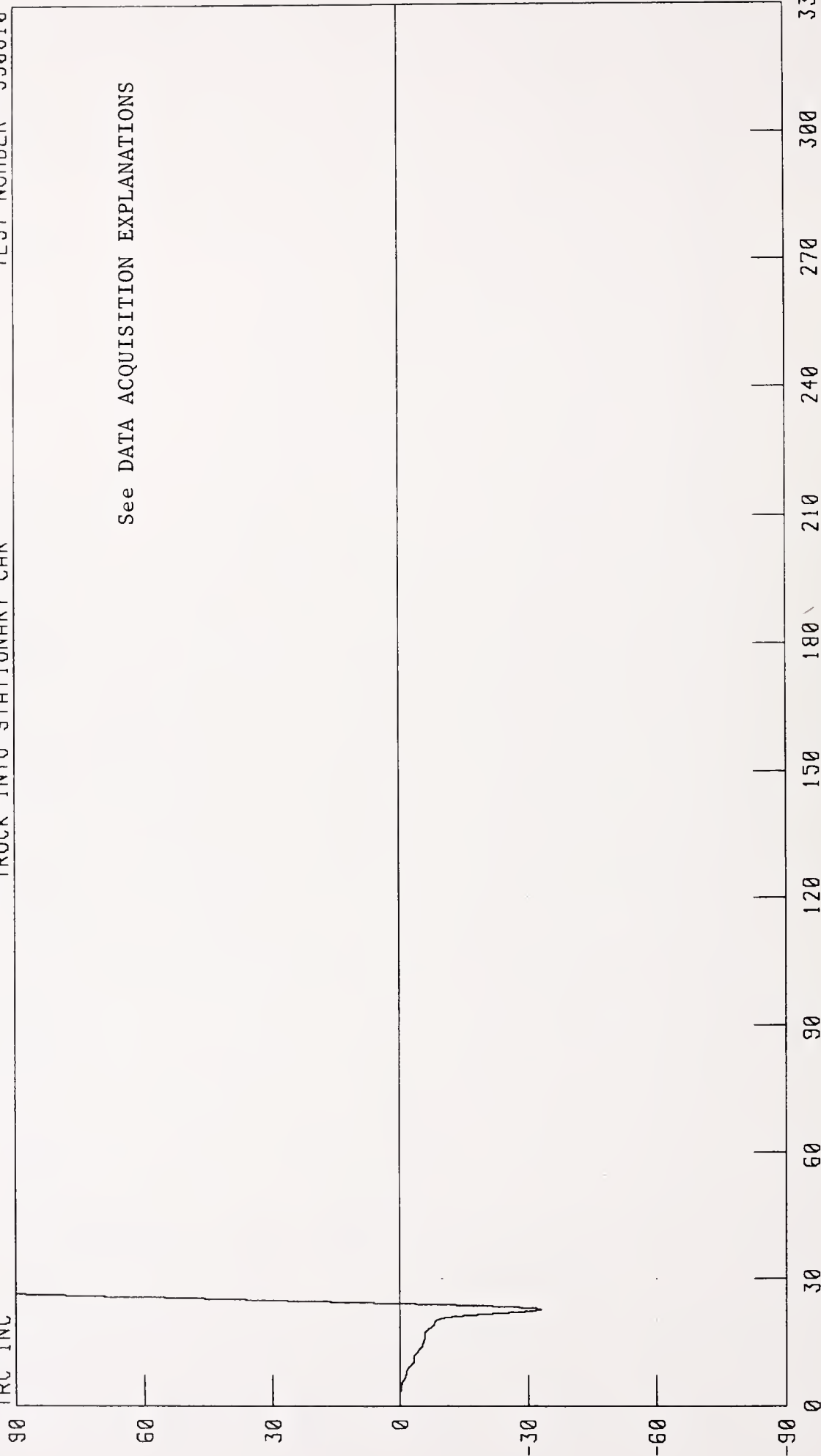
See DATA ACQUISITION EXPLANATIONS

CHANNEL BCLXG1 FILTER CH CLASS 60
PEAK DATA 1103 81 G @ 42 25 MS, -140 25 G @ 20 25 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 LEFT BRAKE CALIPER X-AXIS VELOCITY
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



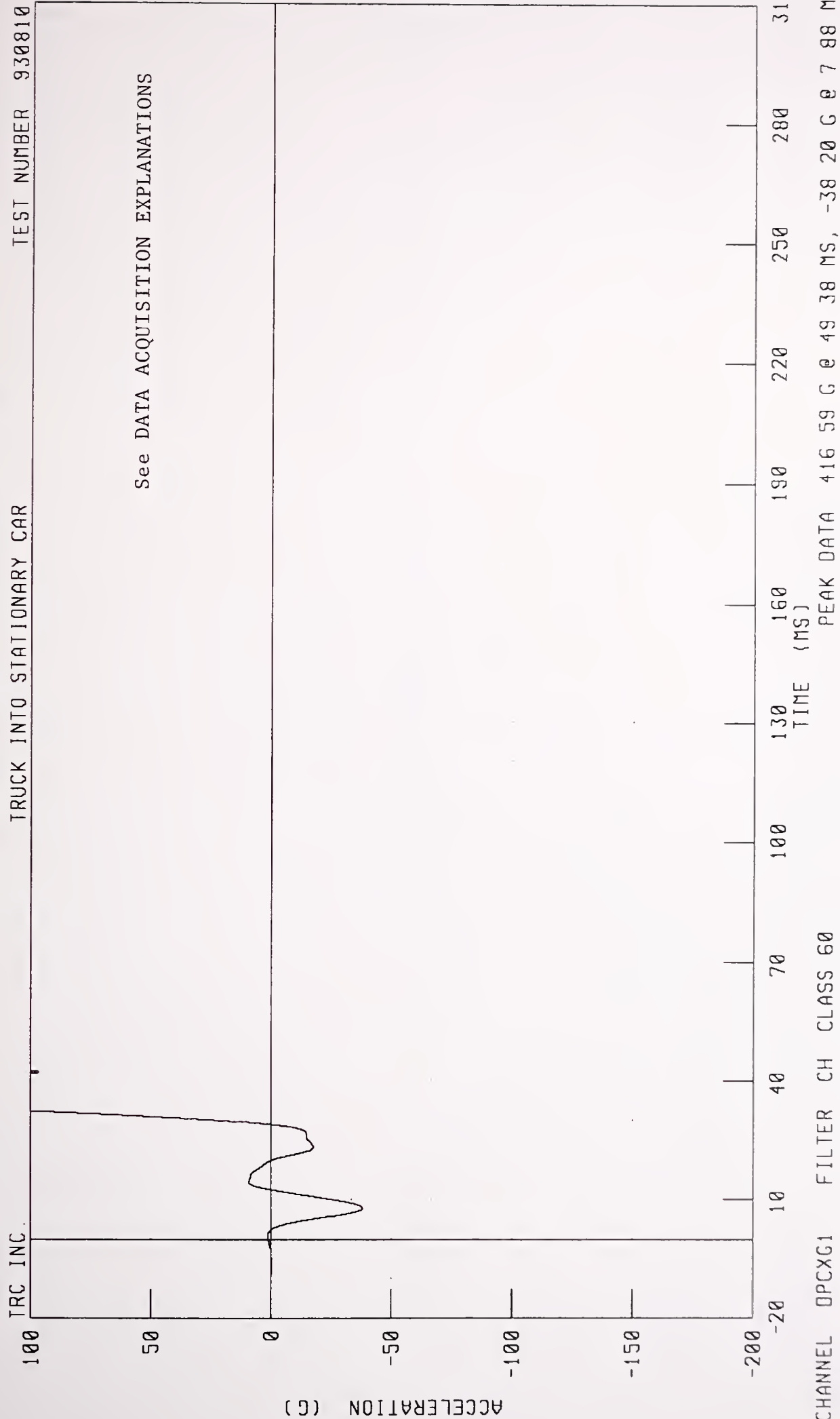
CHANNEL: BCLXV1 FILTER: CH CLASS 180

TIME (MS)

PEAK DATA 9168 70 KM/H @ 330 00 MS, -33 08 KM/H @ 22 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION

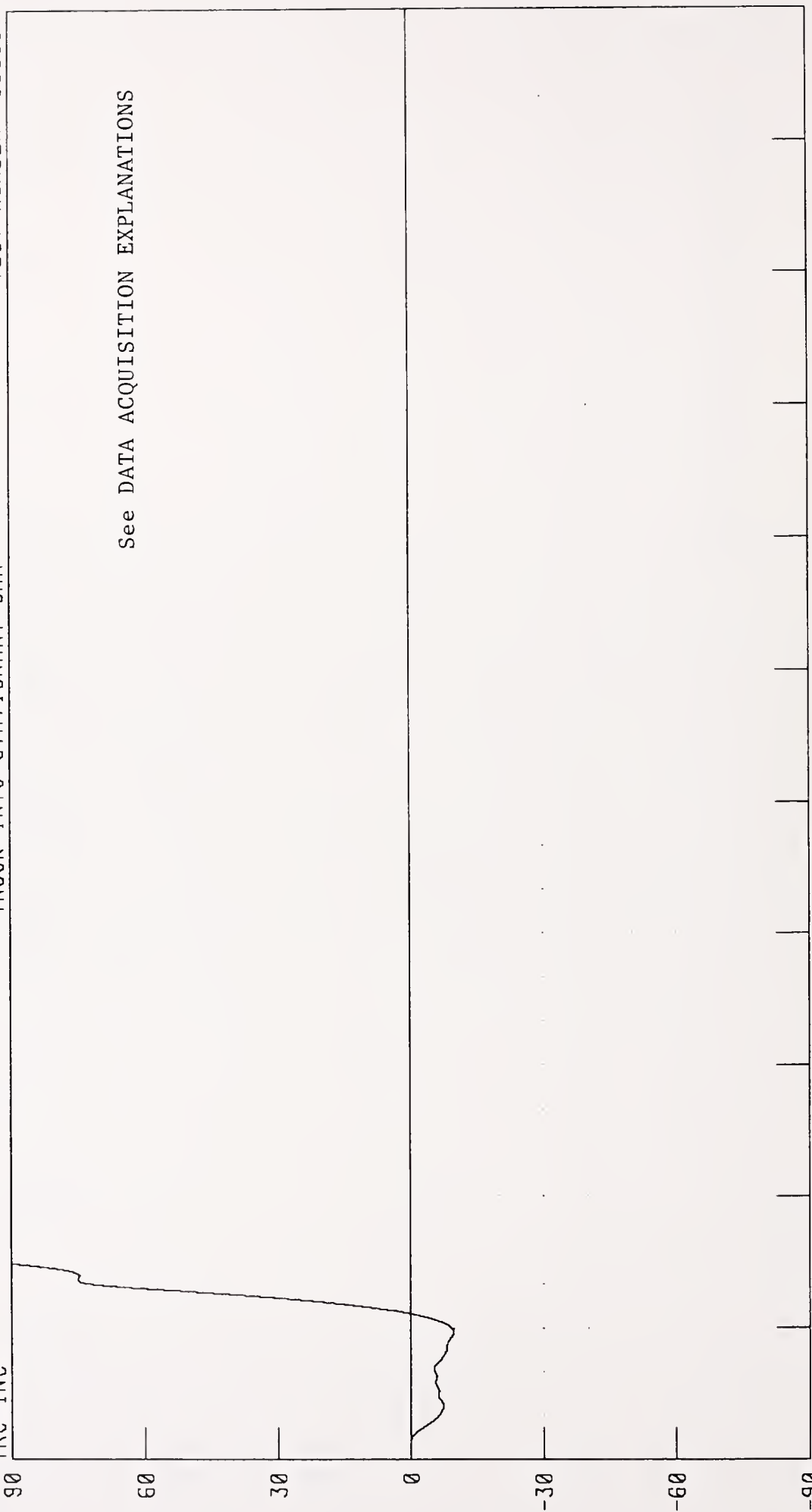
TRUCK INTO STATIONARY CAR TEST NUMBER 930810



REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
INSTRUMENT PANEL CENTER X-AXIS VELOCITY

TRUCK INTO STATIONARY CAR TEST NUMBER 930810

TRC INC

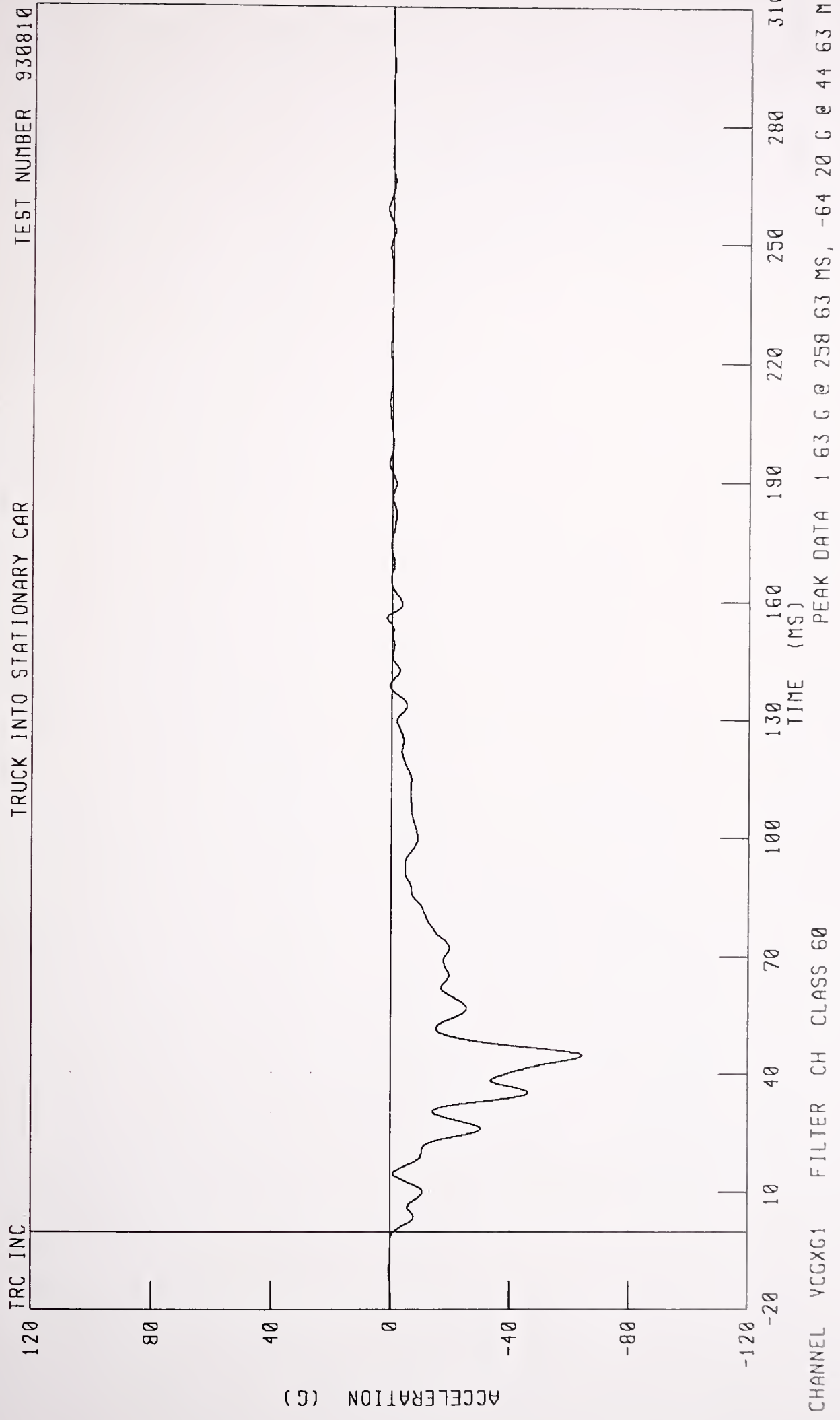


CHANNEL DPCXV1 FILTER CH CLASS 180
TIME (MS) 150 180 210 240 270 300 330
PEAK DATA 4196 15 KM/H @ 330 00 MS, -9 67 KM/H @ 29 13 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
CAR CENTER OF GRAVITY X-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

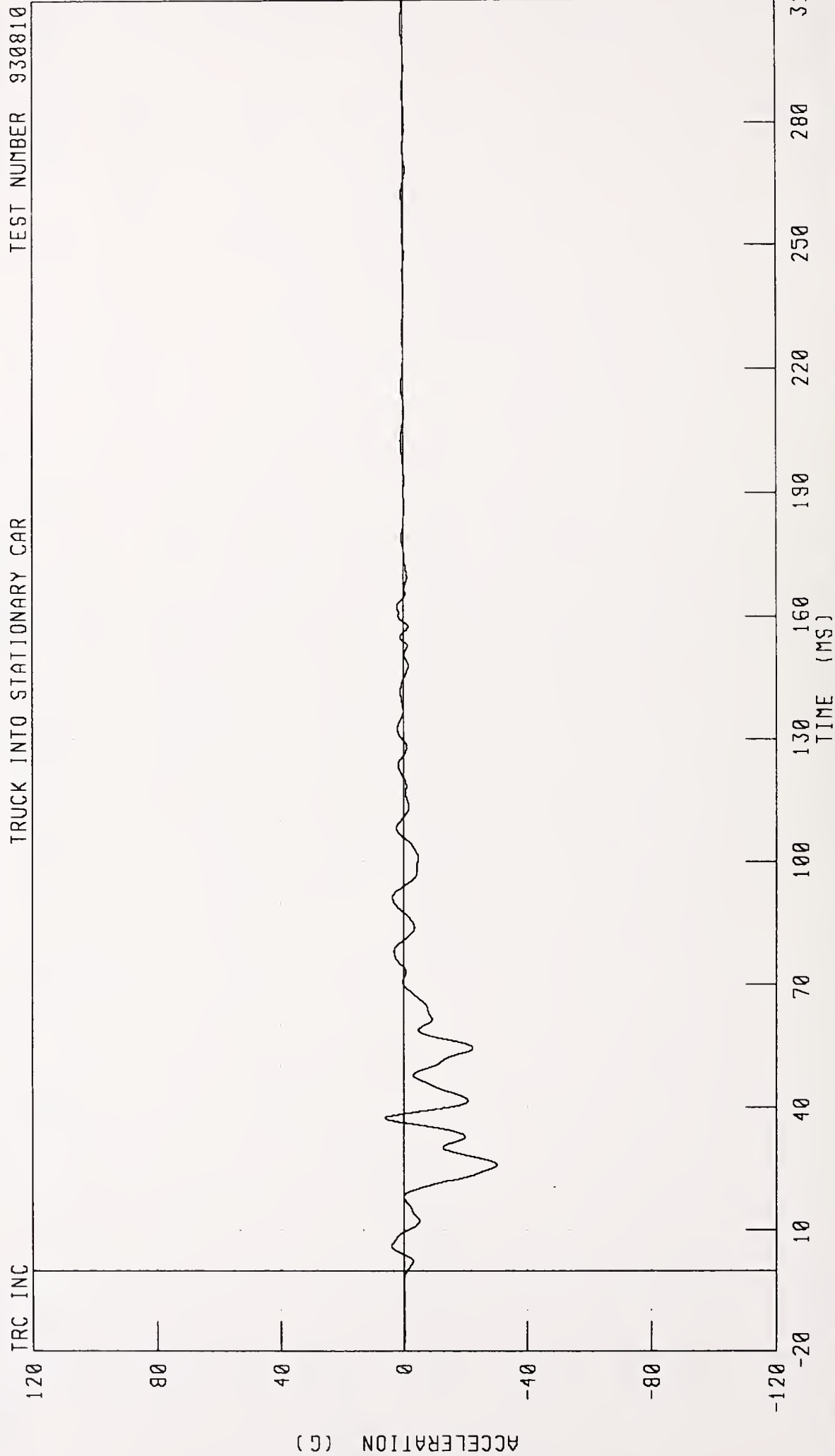
TRC INC



CHANNEL VCGXG1 FILTER CH CLASS 60

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 CAR CENTER OF GRAVITY Y-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR TEST NUMBER 930810



CHANNEL VCGYG1 FILTER CH CLASS 60

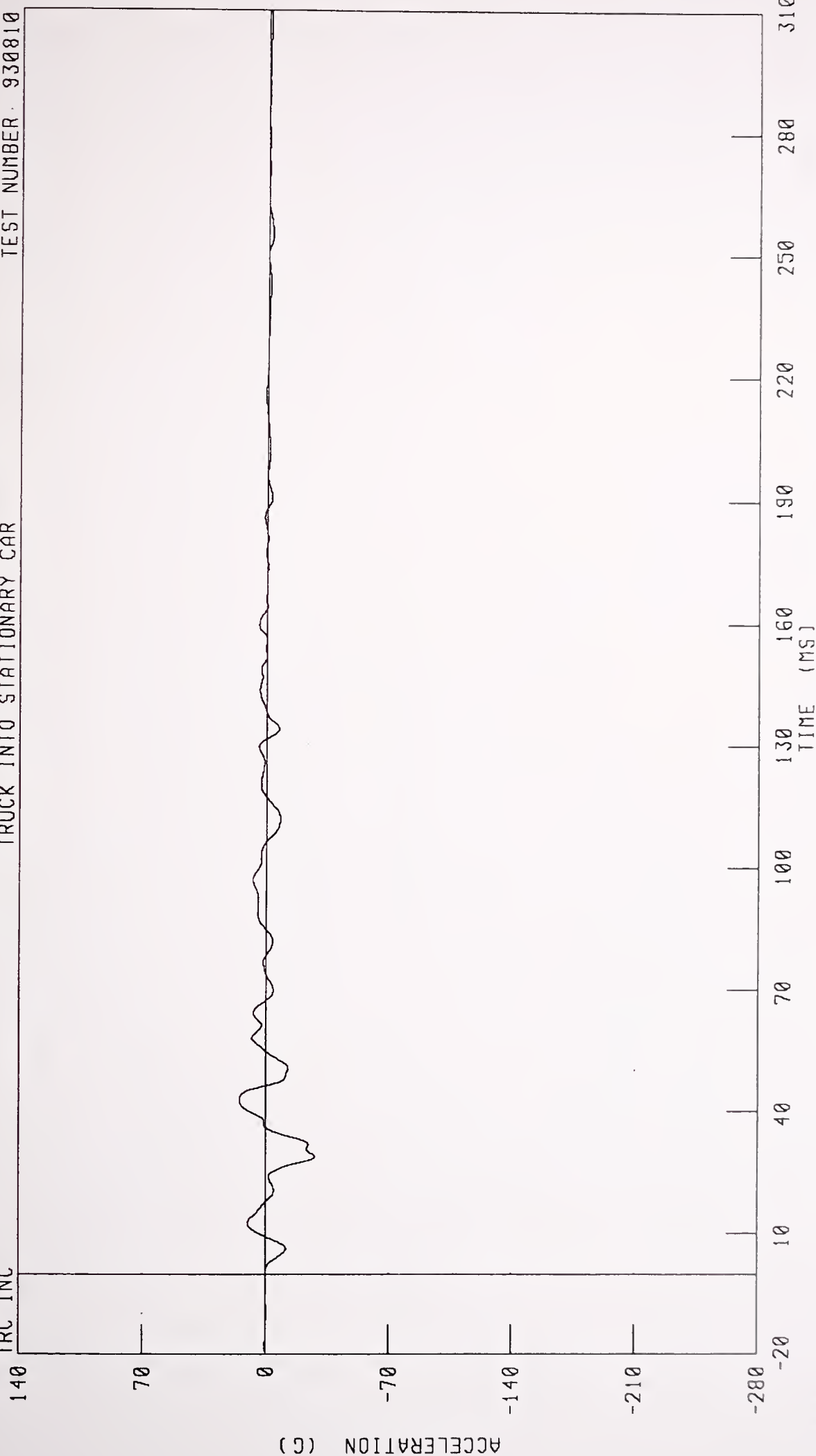
PEAK DATA 6 15 G @ 37 50 MS, -30 23 G @ 26 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 CAR CENTER OF GRAVITY Z-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR

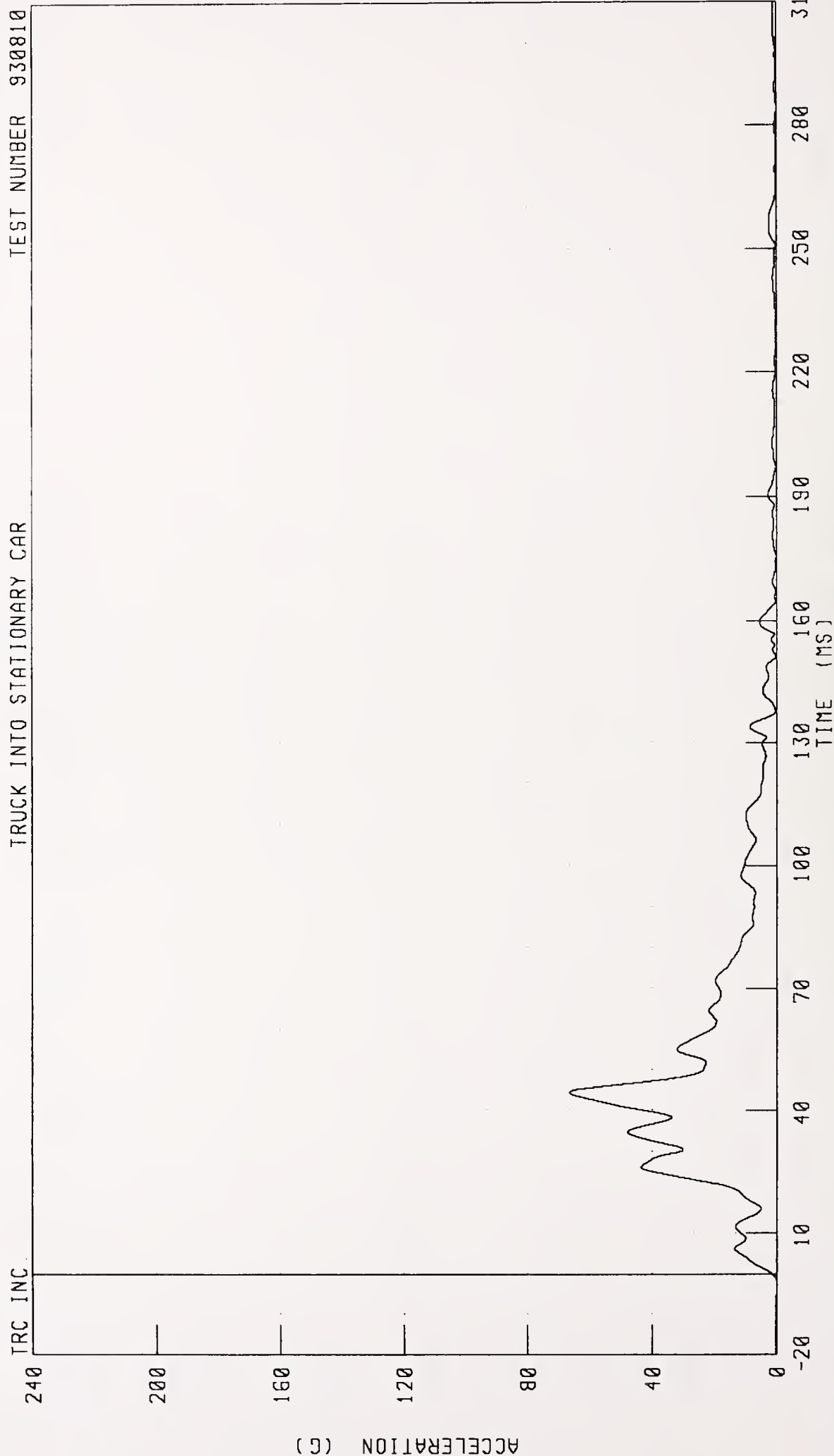
TEST NUMBER 930810

TRC INC



CHANNEL VCGZG1 FILTER CH CLASS 60 PEAK DATA 14 91 G @ 42 75 MS, -27 85 G @ 28 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 CAR CENTER OF GRAVITY RESULTANT ACCELERATION
 TRUCK INTO STATIONARY CAR



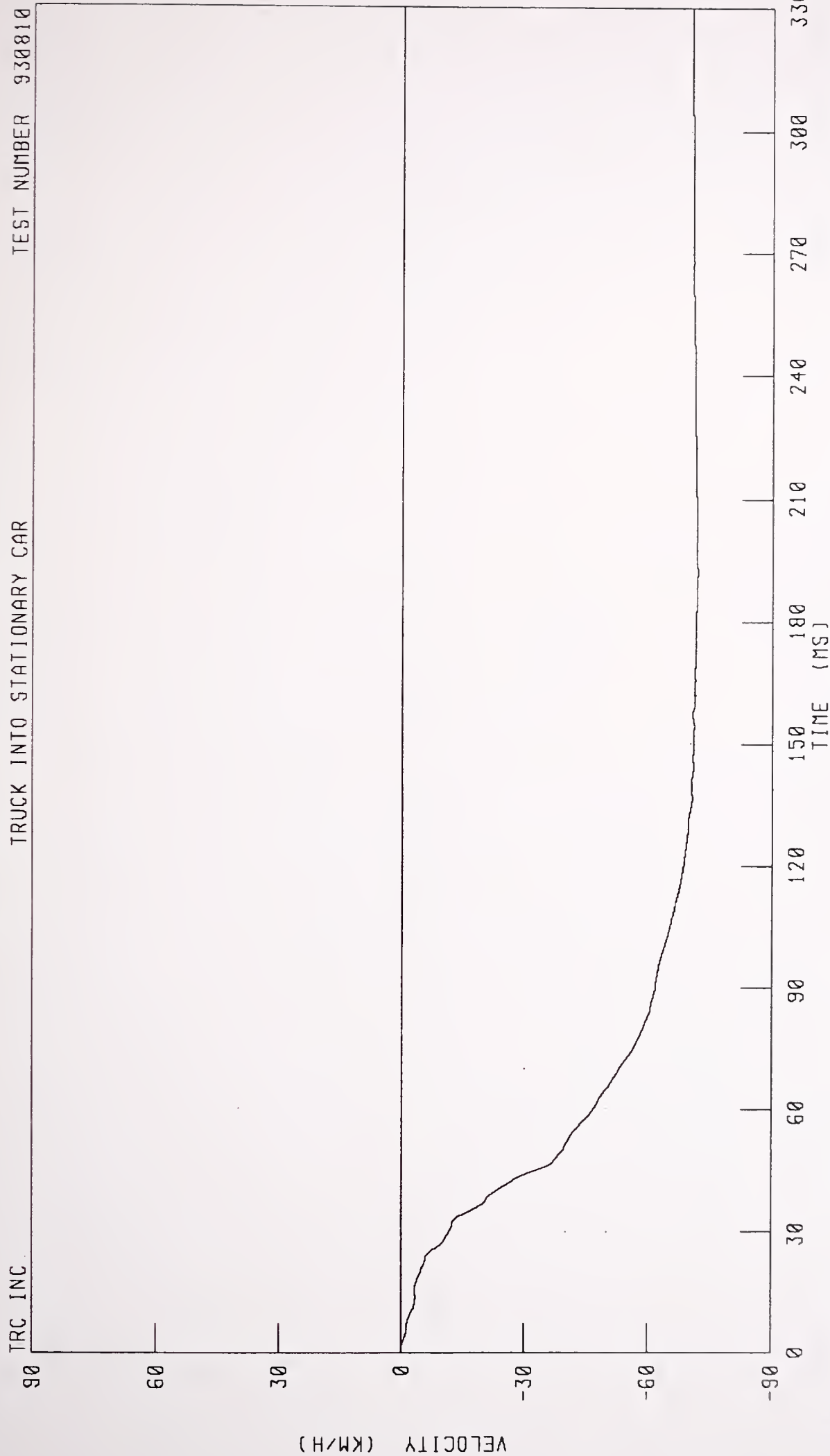
CHANNEL: VCGRG1 FILTER: CH CLASS 60

PEAK DATA 66 43 G @ 44 38 MS, 0 07 G @ -2 13 MS

TEST NUMBER 930810

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
CAR CENTER OF GRAVITY X-AXIS VELOCITY

TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER 930810



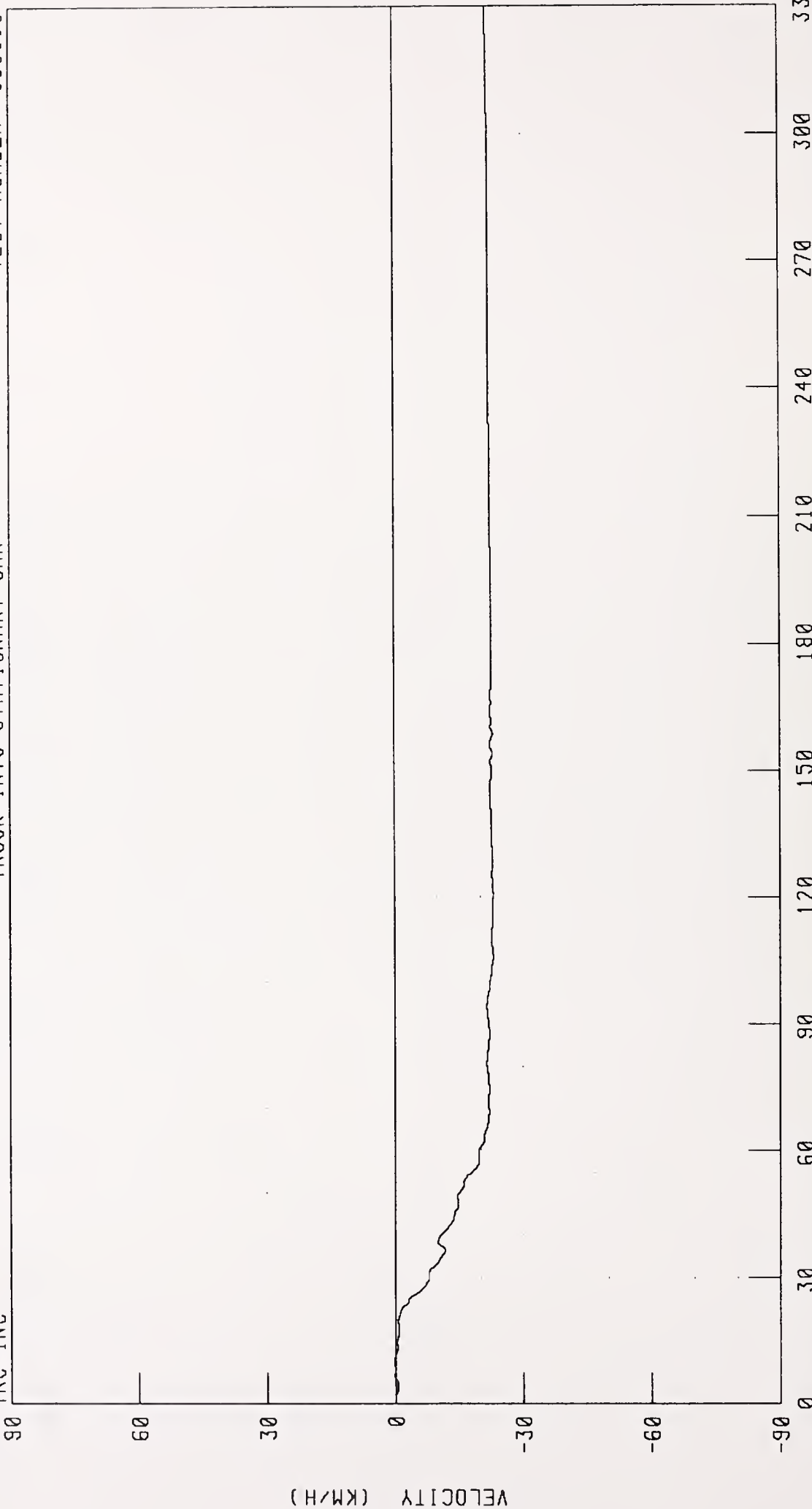
CHANNEL VCGXV1 FILTER CH CLASS 180 PEAK DATA 0 01 KM/H @ 1 00 MS, -71 76 KM/H @ 192 25 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 CAR CENTER OF GRAVITY Y-AXIS VELOCITY

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



TIME (MS)

PEAK DATA 0 36 KM/H @ 10.00 MS, -23.01 KM/H @ 106.00 MS

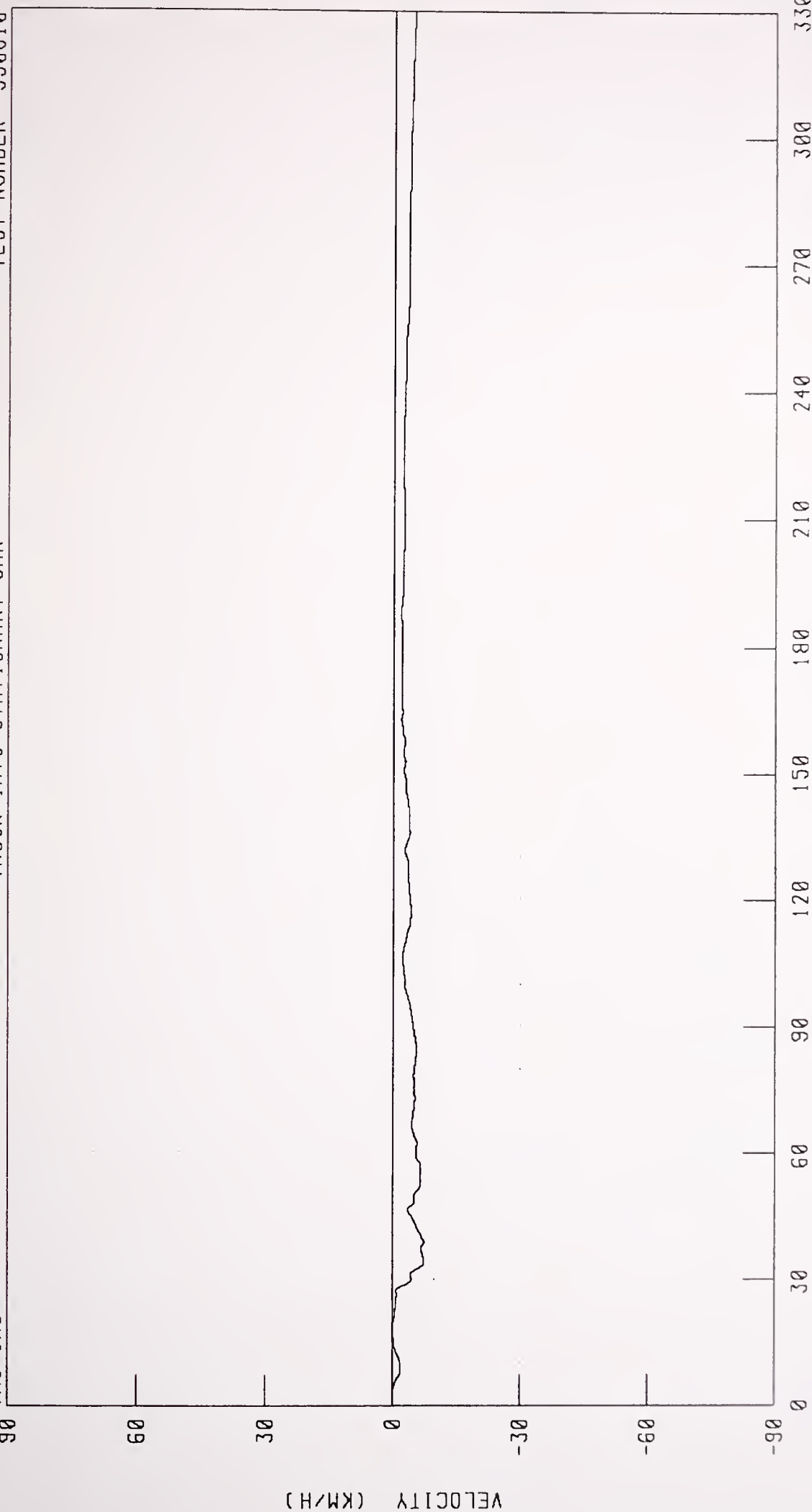
CHANNEL VCGYV1 FILTER: CH. CLASS 180

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
CAR CENTER OF GRAVITY Z-AXIS VELOCITY

TRC INC

TRUCK INTO STATIONARY CAR

TEST NUMBER 930810



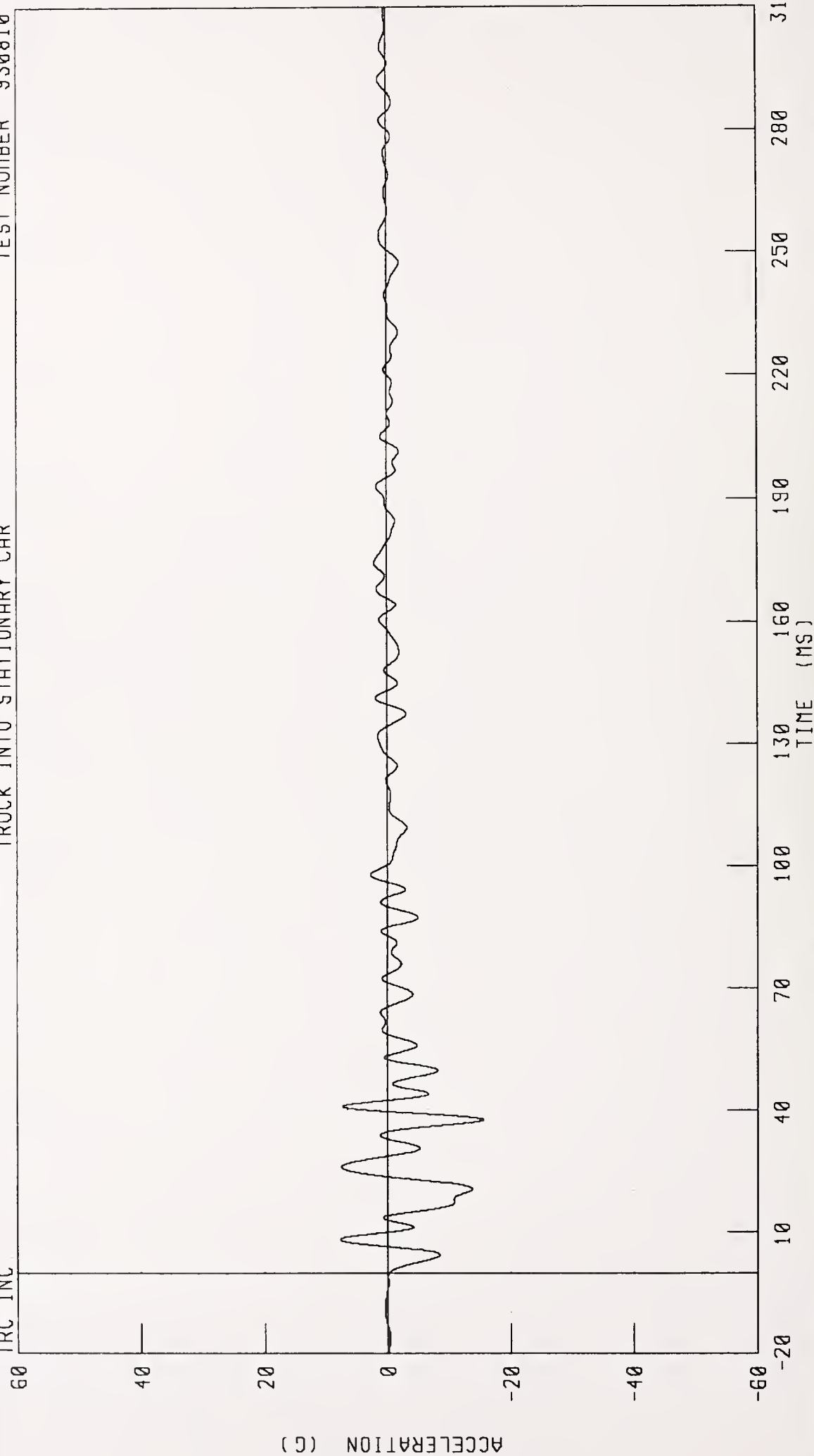
CHANNEL VCGZV1 FILTER CH CLASS 180

PEAK DATA 0 11 KM/H @ 18 38 MS, -7 49 KM/H @ 38 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
 TRUCK FRONT FRAME CROSSMEMBER X-AXIS ACCELERATION
 TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC

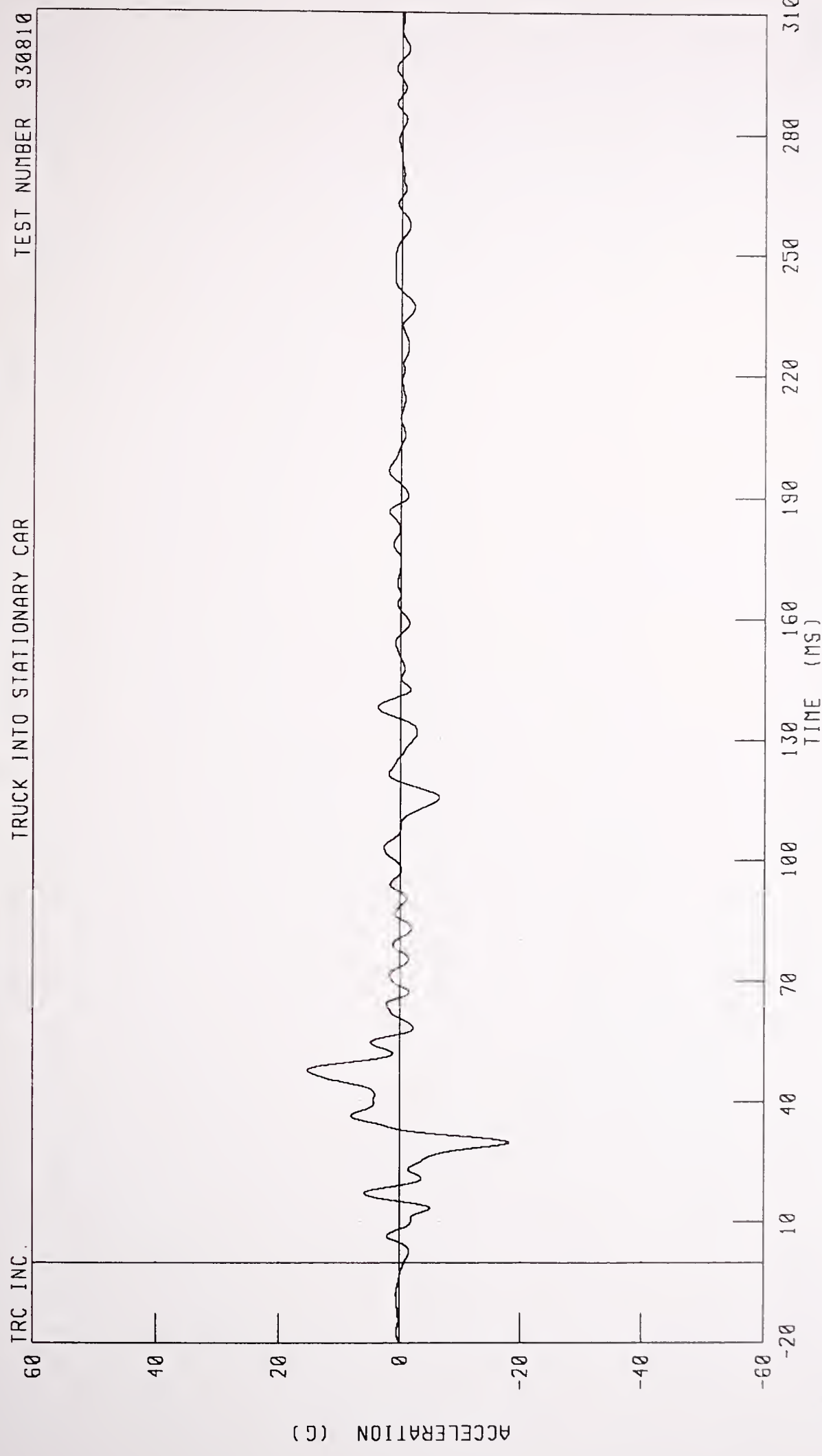


CHANNEL: FFCXGA FILTER: CH CLASS 60

PEAK DATA 7 87 G @ 8 13 MS, -15 57 G @ 37 63 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS ACCELERATION
TRUCK INTO STATIONARY CAR

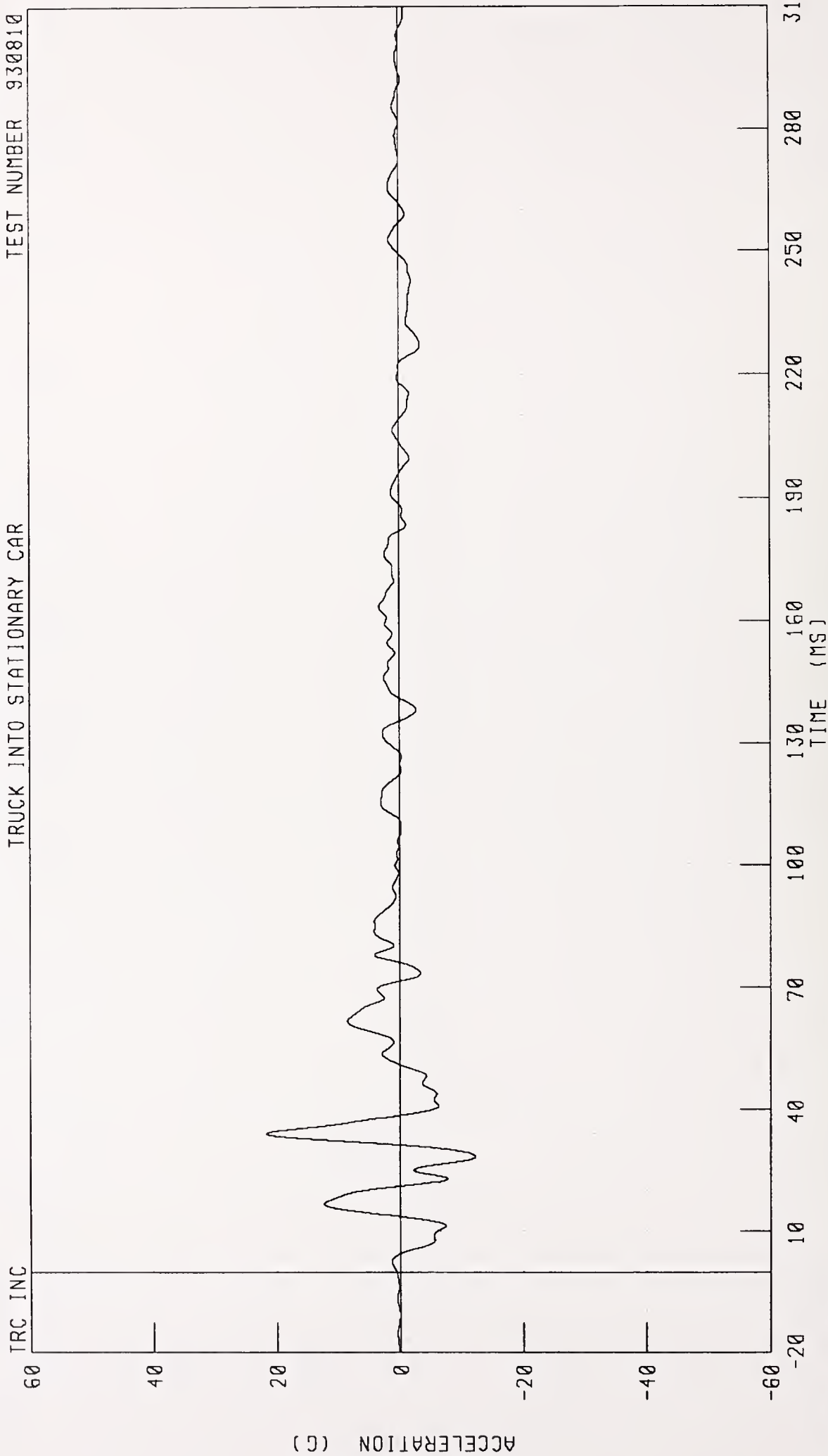
TEST NUMBER 930810



CHANNEL FFCYGA FILTER CH CLASS 60
PEAK DATA 15 20 G @ 47 88 MS, -18 14 G @ 29 88 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK FRONT FRAME CROSSMEMBER Z-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR TEST NUMBER 930810

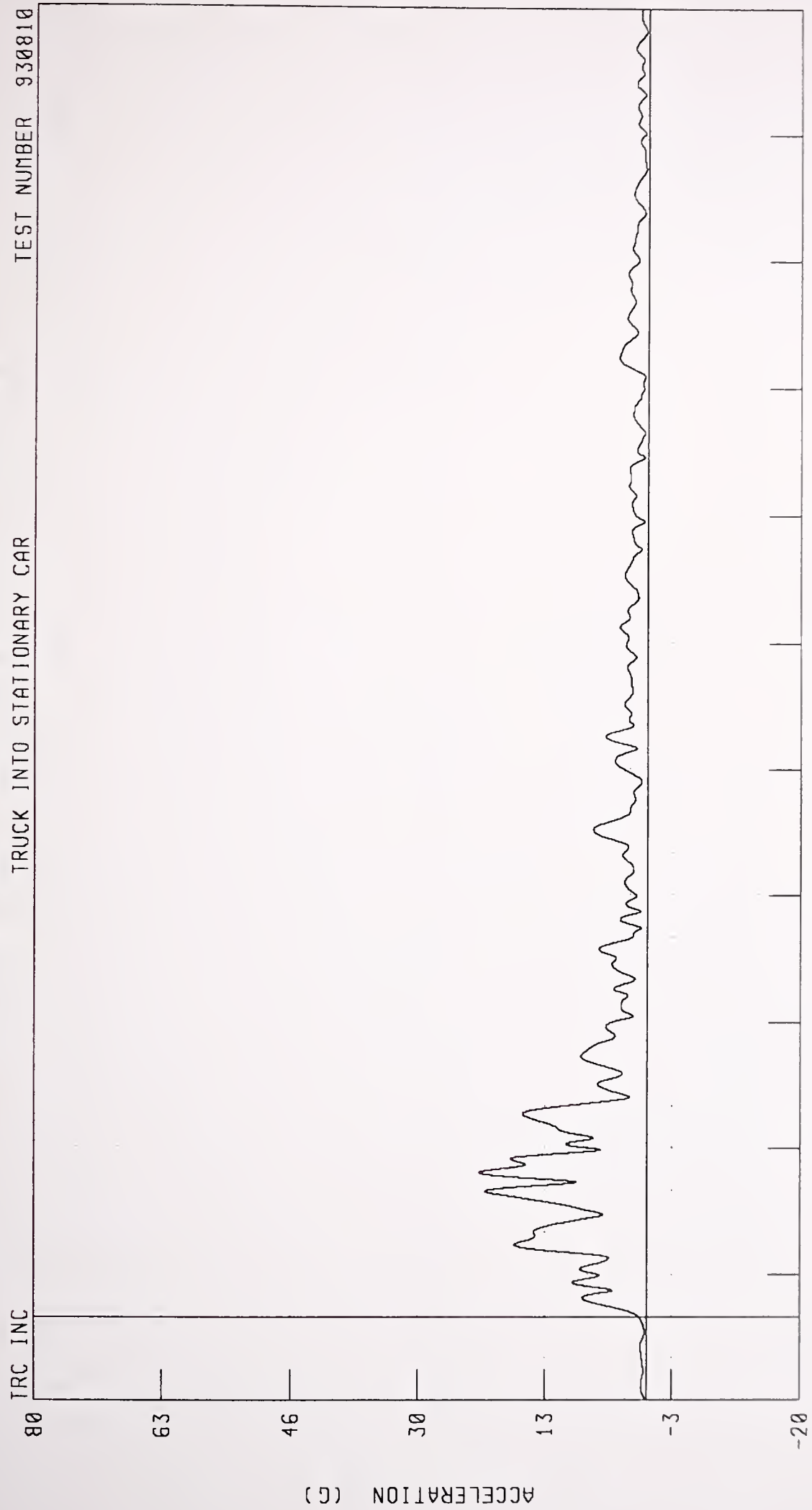


PEAK DATA 21 72 G @ 34 13 MS, -12 21 G @ 28 38 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK FRONT FRAME CROSSMEMBER RESULTANT ACCELERATION TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

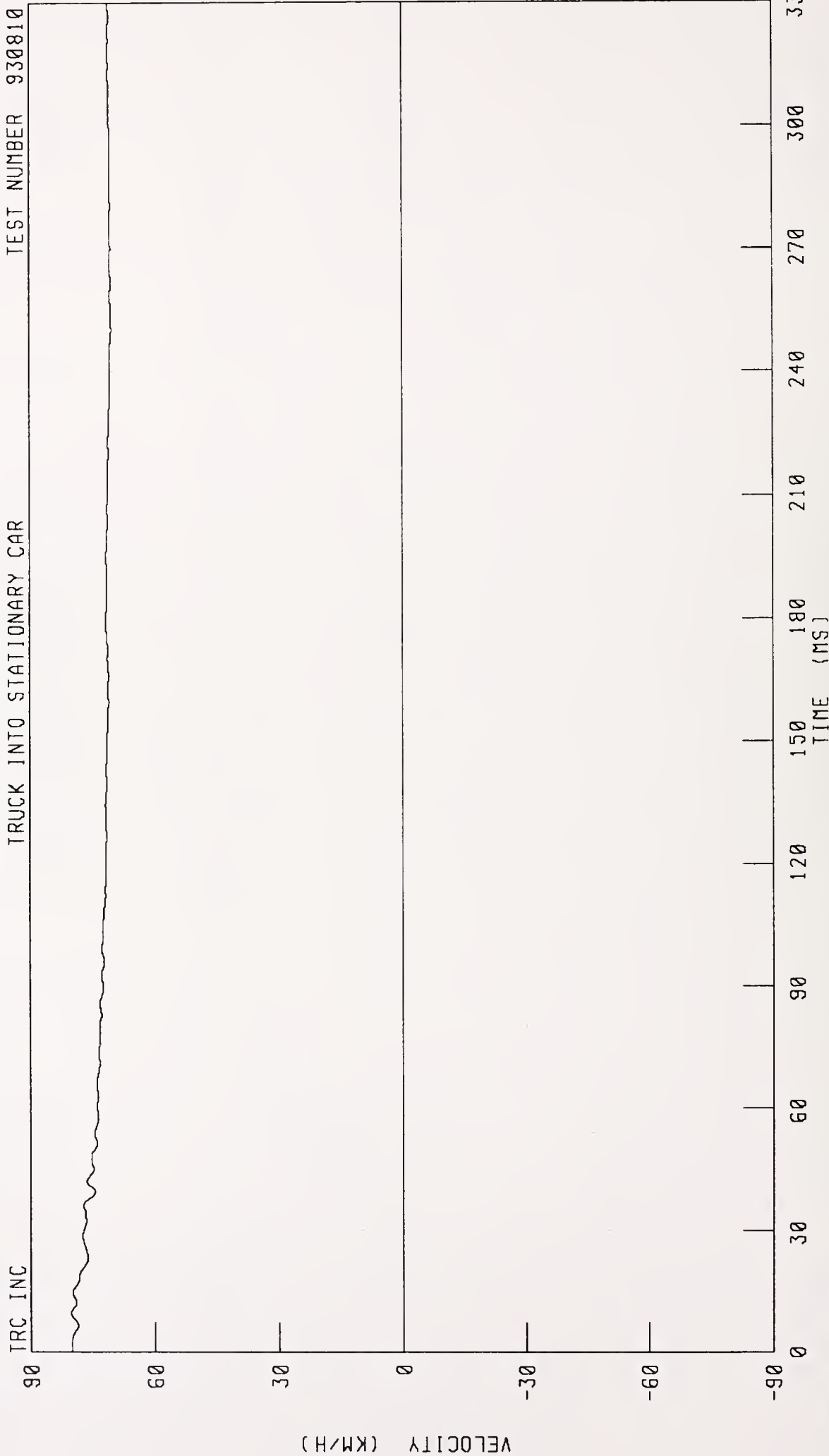
TRC INC



CHANNEL FFCRGA FILTER CH CLASS 60
 PEAK DATA 21 93 G @ 34 13 MS, 0 06 G @ -20 00 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK FRONT FRAME CROSSMEMBER X-AXIS VELOCITY

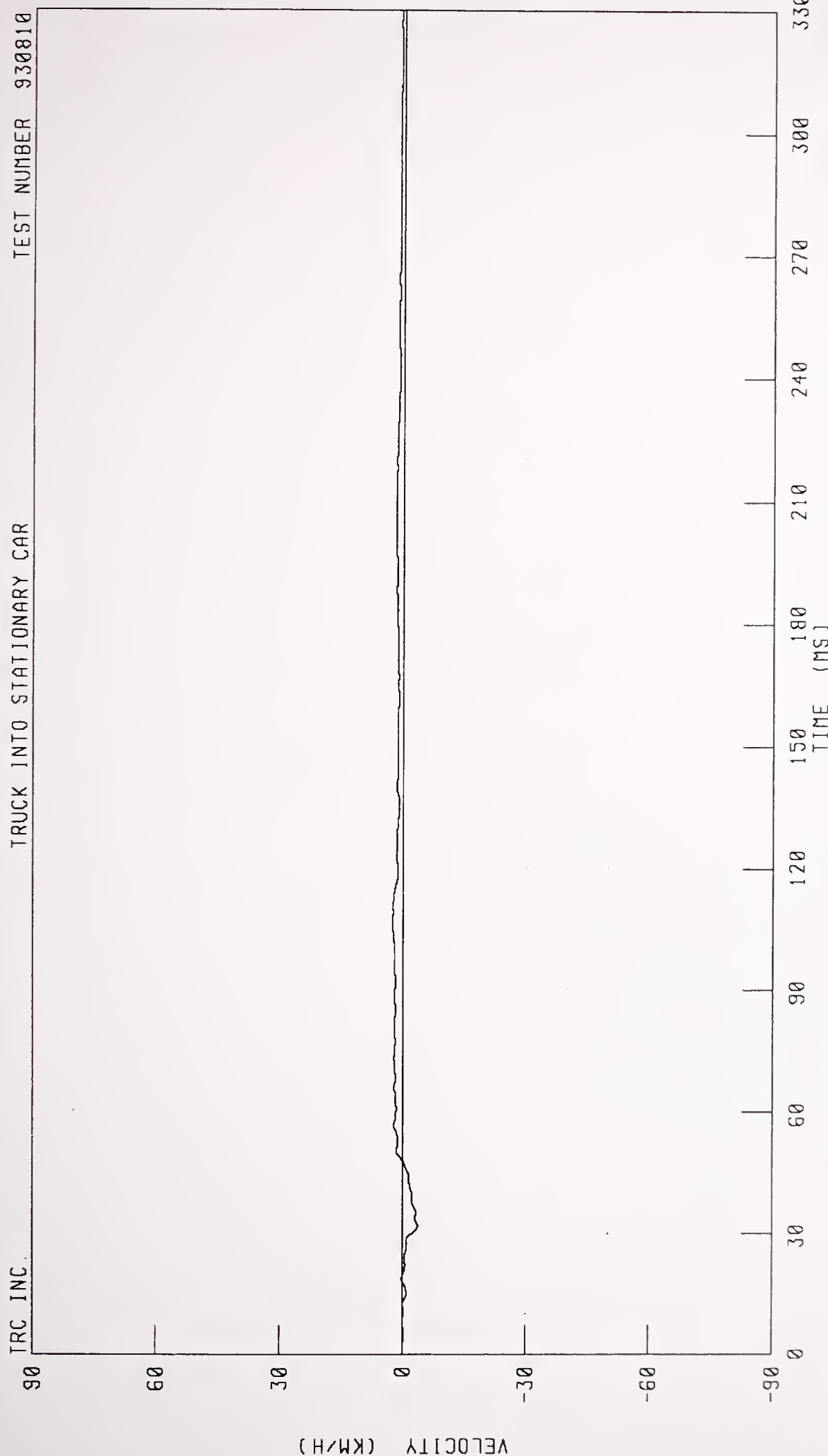
TRUCK INTO STATIONARY CAR TEST NUMBER 930810



CHANNEL: FFCXVA FILTER: CH CLASS 180

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
TRUCK FRONT FRAME CROSSMEMBER Y-AXIS VELOCITY

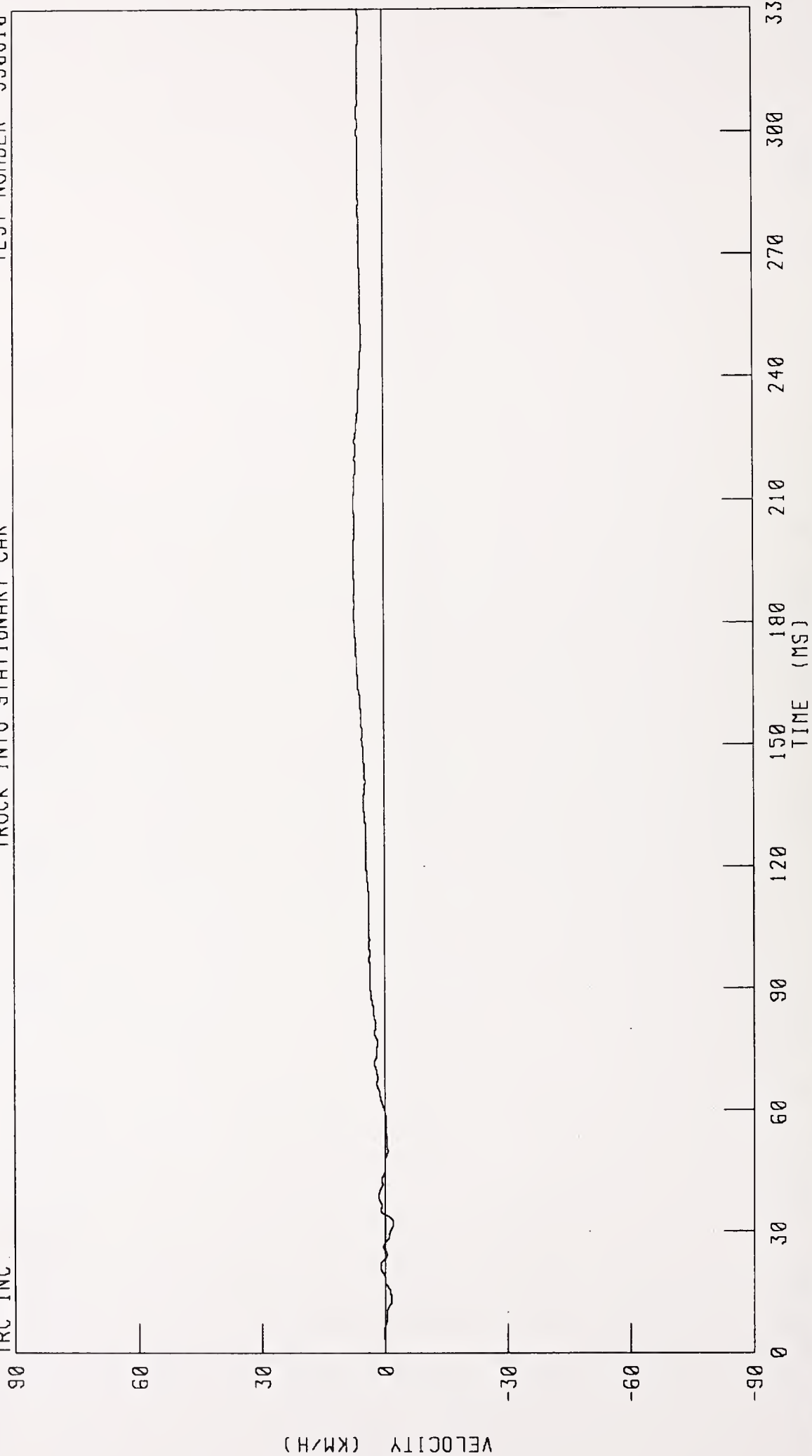
TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER 930810



CHANNEL FFCYVA FILTER CH CLASS 180 PEAK DATA 2 49 KM/H @ 105 25 MS, -3 68 KM/H @ 31 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK FRONT FRAME CROSSMEMBER Z-AXIS VELOCITY

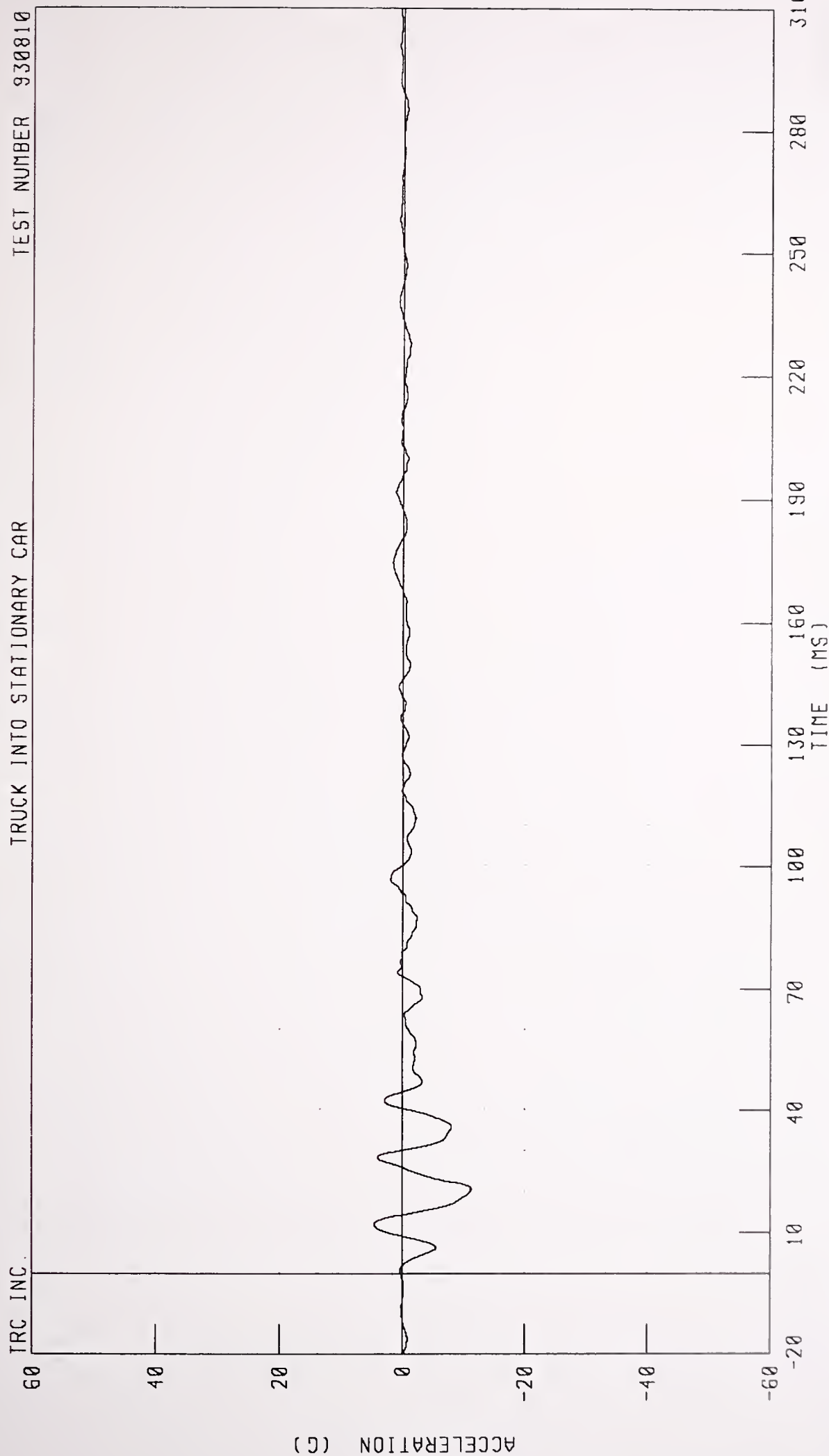
TRC INC. TRUCK INTO STATIONARY CAR TEST NUMBER 930810



CHANNEL: FFCZVA FILTER: CH CLASS 180

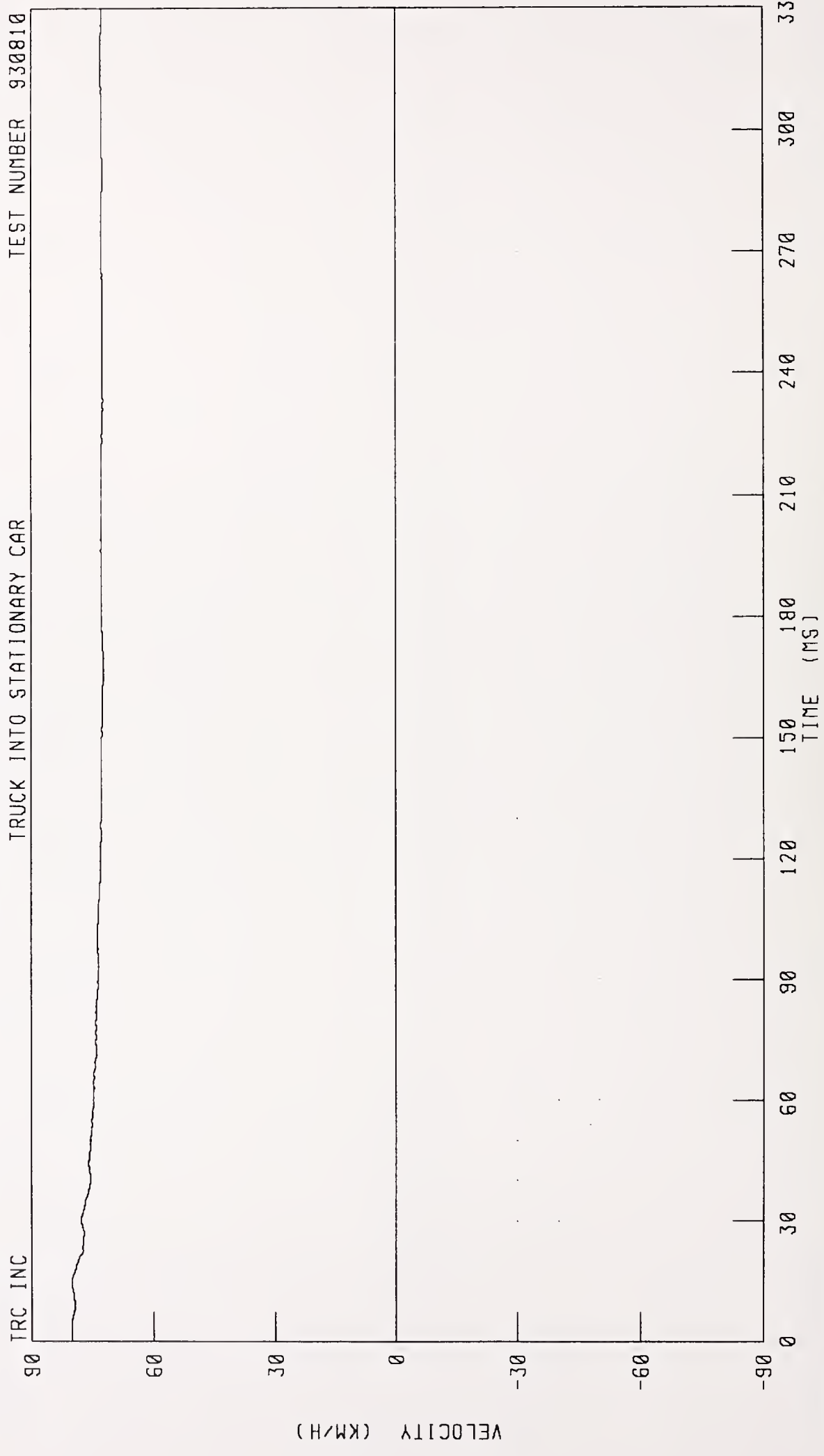
REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17
TRUCK CENTER OF GRAVITY X-AXIS ACCELERATION

TRUCK INTO STATIONARY CAR TEST NUMBER 930810



PEAK DATA 4 63 G @ 12 00 MS, -11 28 G @ 20 50 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK CENTER OF GRAVITY X-AXIS VELOCITY



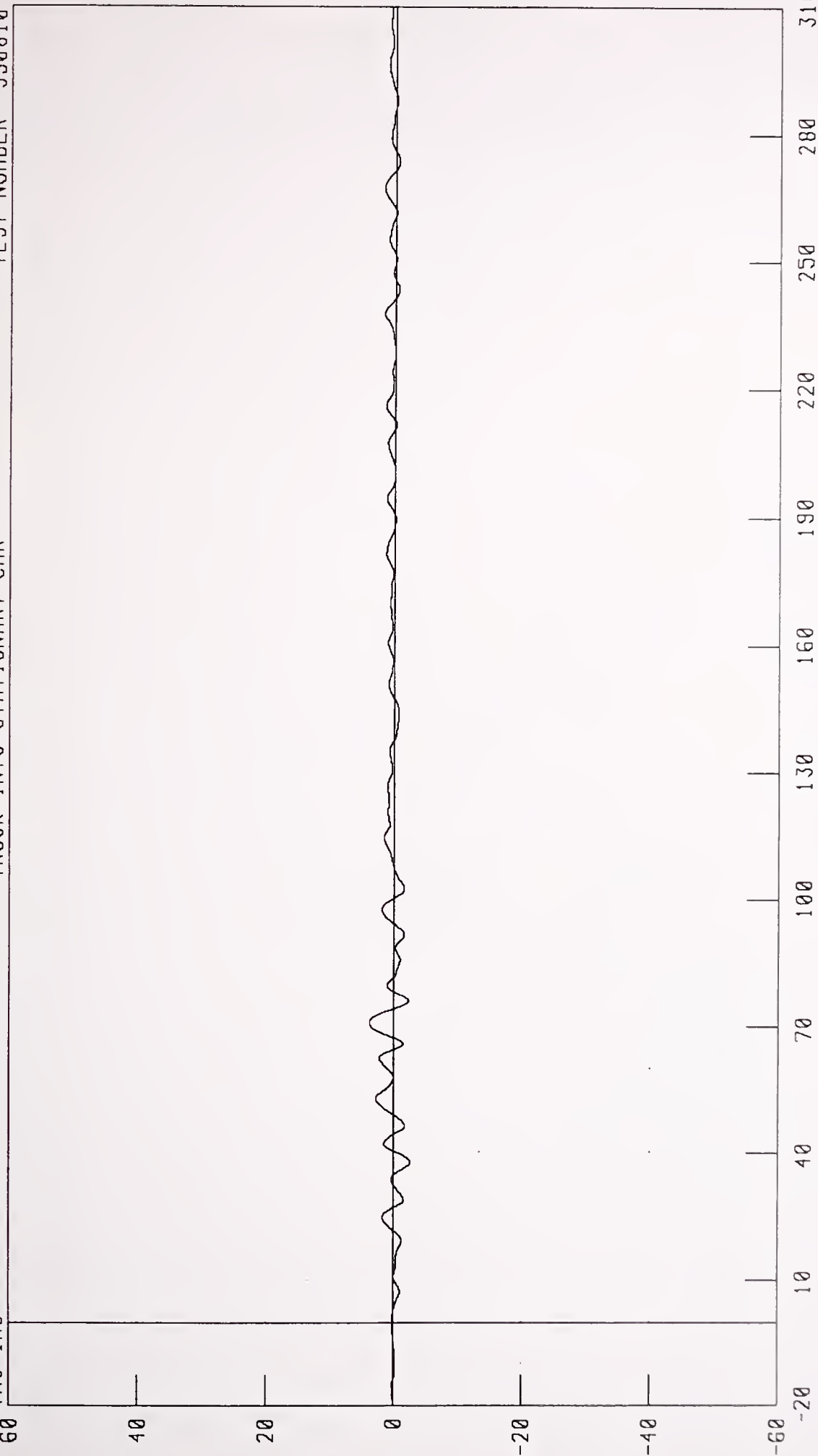
CHANNEL VCGXVA FILTER CH CLASS 180 PEAK DATA 80 12 KM/H @ 2 50 MS, 72 15 KM/H @ 166 13 MS

TEST NUMBER 930810

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK CENTER OF GRAVITY Y-AXIS ACCELERATION TRUCK INTO STATIONARY CAR

TEST NUMBER 930810

TRC INC



CHANNEL VCCYGA FILTER CH CLASS 60

PEAK DATA 3 81 G @ 70 88 MS, -2 58 G @ 37 75 MS

REDUCING HEAVY TRUCK AGGRESSIVENESS - TEST 17 TRUCK CENTER OF GRAVITY Y-AXIS VELOCITY TRUCK INTO STATIONARY CAR

TRC INC TEST NUMBER 930810

90

60

30

0

-30

-60

-90

VELOCITY (KM/H)

0 30 60 90 120 150 180 210 240 270 300 330

TIME (MS)

CHANNEL VCGYVA FILTER: CH CLASS 180

PEAK DATA 3 82 KM/H @ 324 50 MS, -0 67 KM/H @ 40 50 MS

APPENDIX C

DUMMY CERTIFICATION INFORMATION



TRANSPORTATION RESEARCH CENTER INC.
HYBRID III EXTERNAL DIMENSIONS
48 HUMANOID

05-AUG-93

TRC 48C9ED1 572E SN48 EXT. DIMENSION CAL09

TEST PARAMETER	(DIMEN.)	SPECIFICATION	TEST RESULTS
LOCATION FOR CHEST CIRCUMFERENCE (AA)		429 - 434 MM	432. MM
LOCATION FOR WAIST CIRCUMFERENCE (BB)		226 - 231 MM	229. MM
CHEST CIRCUMFERENCE (Y)		970 - 1001 MM	986. MM
WAIST CIRCUMFERENCE (Z)		836 - 866 MM	851. MM
CHEST DEPTH (D)		213 - 229 MM	218. MM
H-POINT HEIGHT (C)		84 - 89 MM	86. MM
H-POINT FROM SEATBACK (D)		135 - 140 MM	137. MM
SKULL CAP TO BACKLINE (H)		41 - 46 MM	43. MM
TOTAL SITTING HEIGHT (A)		879 - 889 MM	884. MM
THIGH CLEARANCE (F)		140 - 155 MM	155. MM
BUTTOCK KNEE LENGTH (K)		579 - 605 MM	597. MM
BUTTOCK POPLITEAL LENGTH (N)		452 - 478 MM	470. MM
POPLITEAL HEIGHT (L)		429 - 455 MM	432. MM
KNEE PIVOT HEIGHT (M)		485 - 500 MM	493. MM
FOOT LENGTH (P)		252 - 267 MM	259. MM
FOOT BREADTH (W)		91 - 107 MM	99. MM
SHOULDER PIVOT FROM BACKLINE (E)		84 - 94 MM	91. MM
SHOULDER BREADTH (V)		422 - 437 MM	427. MM
SHOULDER PIVOT HEIGHT (B)		506 - 521 MM	511. MM
ELBOW REST HEIGHT (J)		191 - 211 MM	202. MM
SHOULDER-ELBOW LENGTH (I)		330 - 345 MM	343. MM
BACK OF ELBOW TO WRIST PIVOT (G)		290 - 305 MM	295. MM

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER INC.

HEAD DROP TEST

HYBRID III

05-AUG-93

TRC

4809HD

572E SN48 HEAD DROP CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	50.0 %
PEAK RESULTANT ACCELERATION	225 - 275 G	243.04 G
PEAK LATERAL ACCELERATION	15 G MAX	-1.72 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

TEST MEETS SPECIFICATIONS

TECHNICIAN

Chas. Middle

572E 3N48 HEAD DROP CAL 09

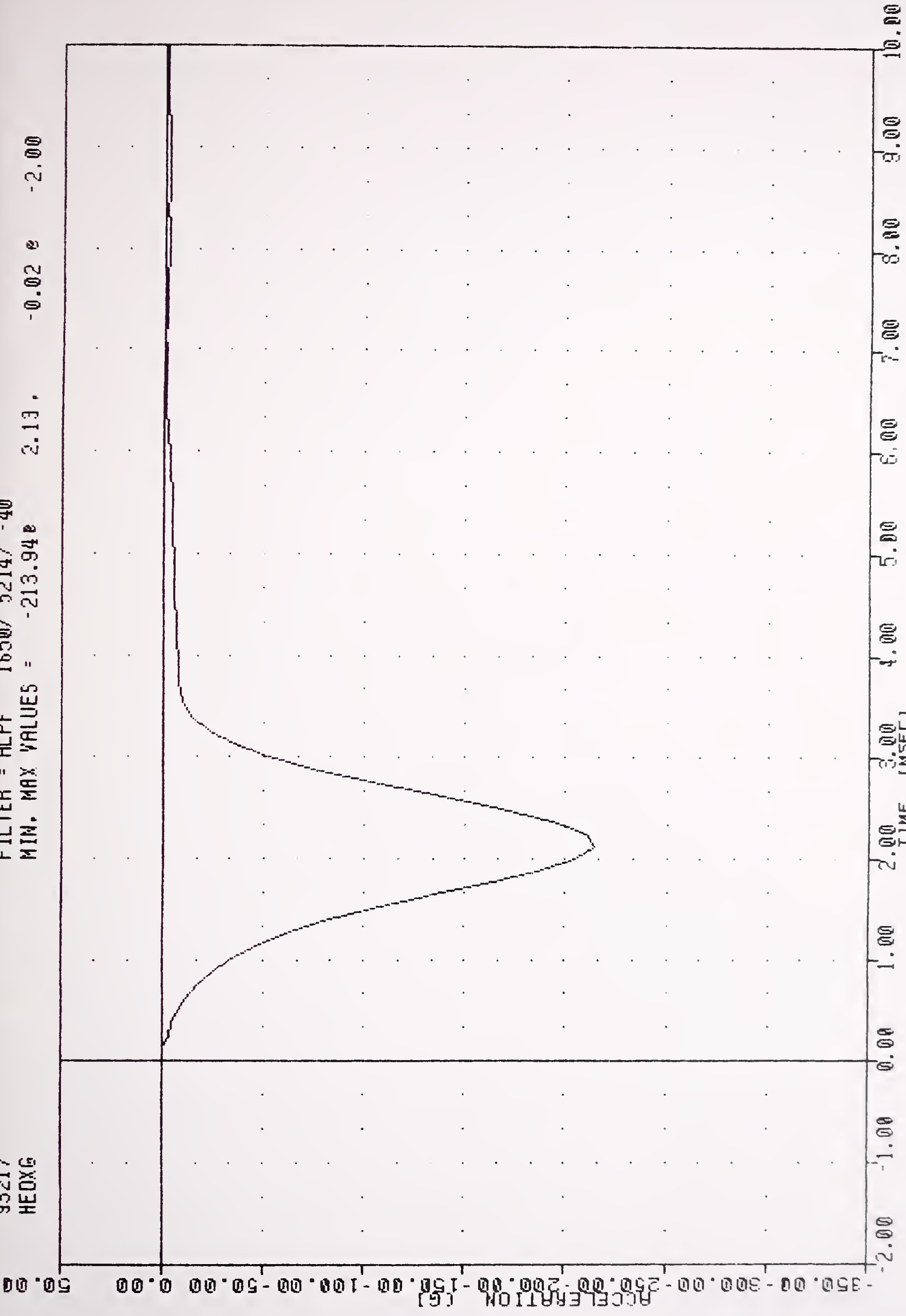
93217

HEADXG

FILTER = ALPF 1650/ 5214/ -40

MIN. MAX VALUES = -213.94e 2.13e

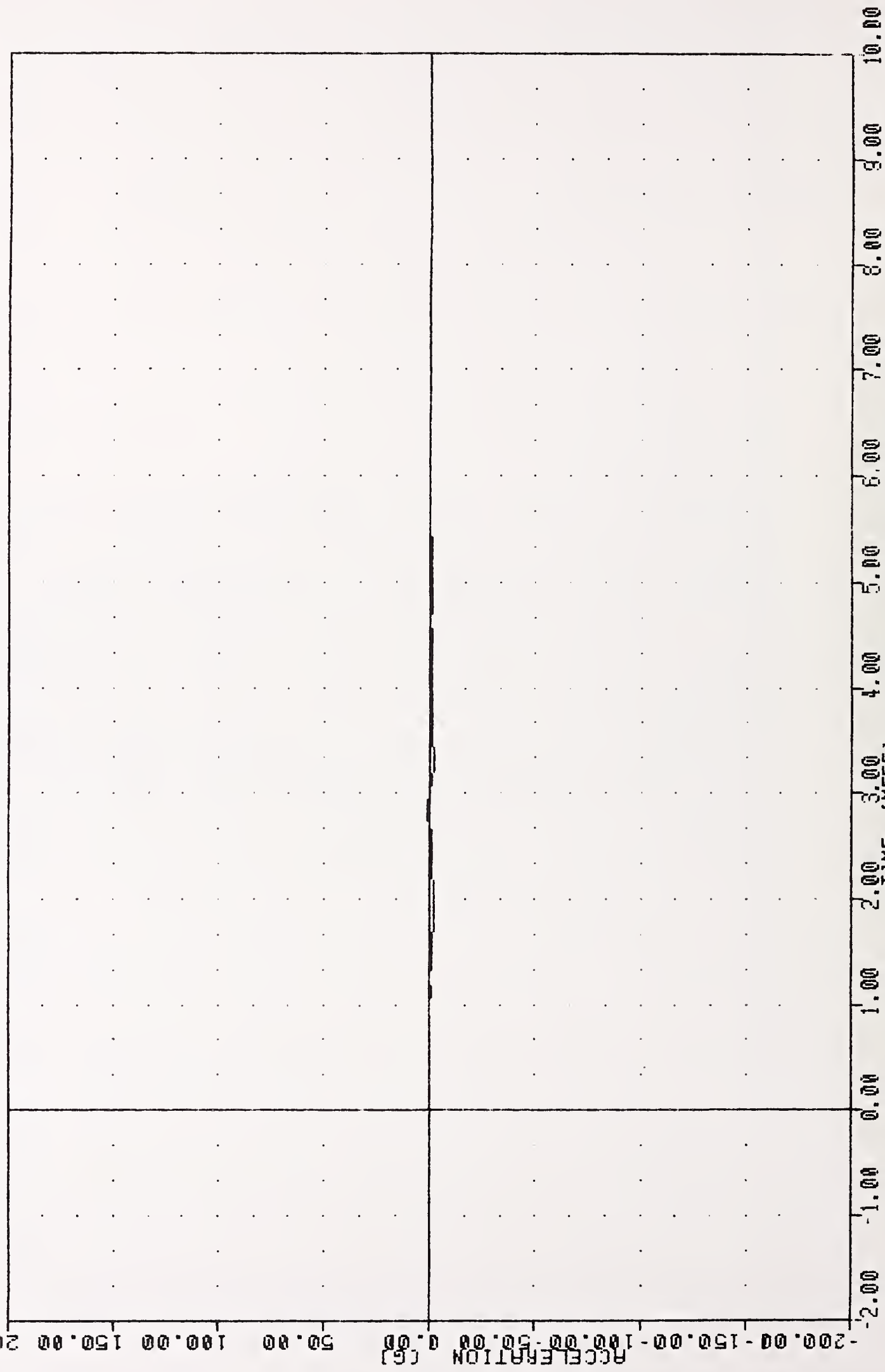
-0.02 e -2.00



PART 572-E HYBRID III HEAD CALIBRATION
HEAD ACCELERATION X AXIS

TRC , 4809HD
 572E SN48 HEAD DROP CAL 09
 93217
 HEDYG

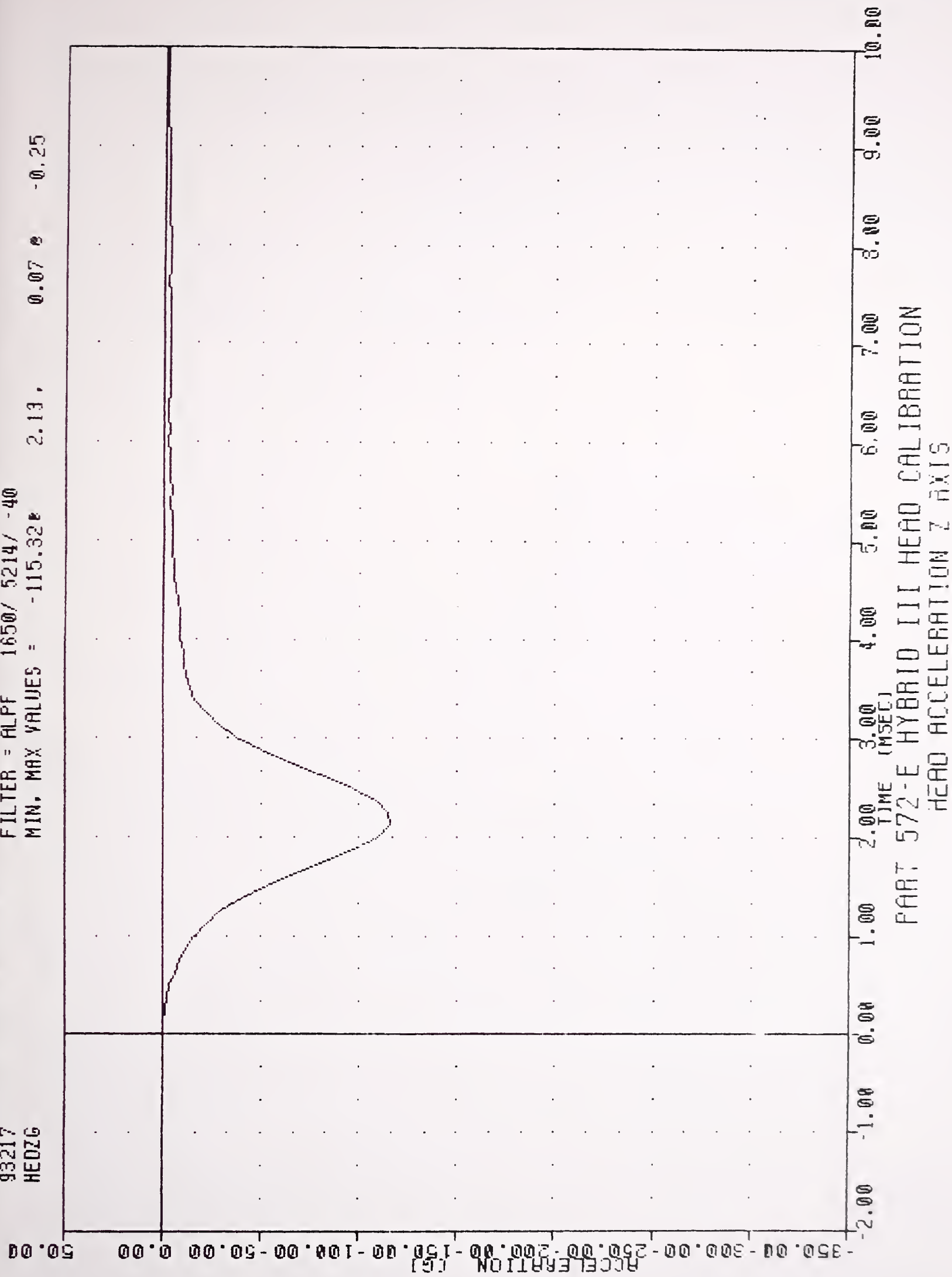
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -1.728 1.88 1.30 2.88



PART 572-E HYBRID III HEAD CALIBRATION
 HEAD ACCELERATION Y AXIS

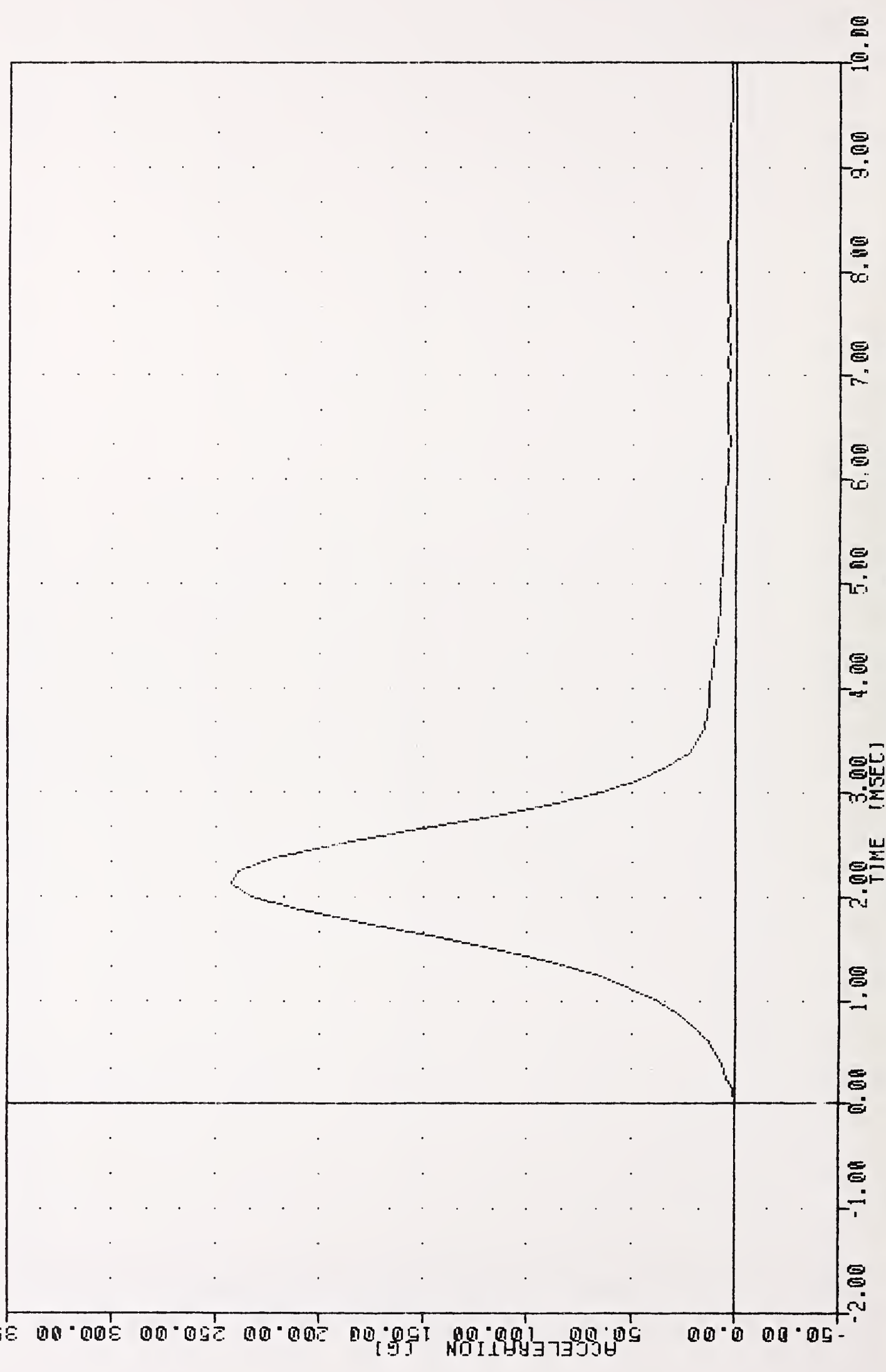
TBC , 4809HD
572E SN48 HEAD DROP CAL 09
93217
HEDZG

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -115.32 2.13, 0.07 0 -0.25



TRC
572E SN48 HEAD DROP CAL 03
93217
HEADRG

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.038 -2.00 243.04 2.13



PART 572-E HYBRID III HEAD CALIBRATION
HEAD RESULTANT ACCELERATION

TRANSPORTATION RESEARCH CENTER INC.

NECK FLEXION TEST

HYBRID III

05-AUG-93

6 AXIS NECK TRANSDUCER
TRC 48C9NF1

572E SN48 NECK FLEXION CAL09

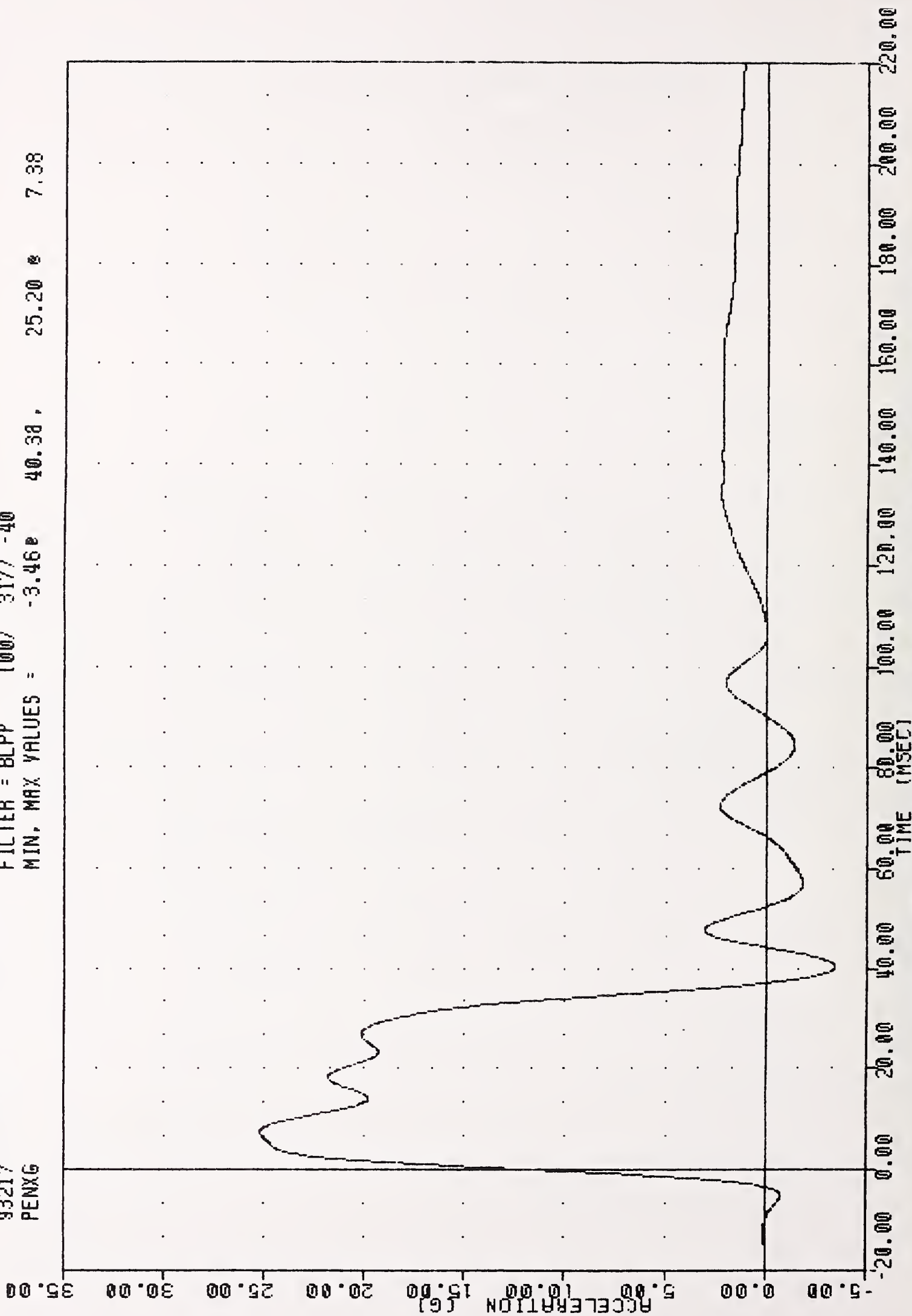
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	50.0 %
IMPACT VELOCITY	6.89 - 7.13 M/SEC	7.10 M/SEC
PENDULUM	10 MS 22.50 - 27.50 G	23.51 G
DECELERATION	20 MS 17.60 - 22.60 G	21.09 G
	30 MS 12.50 - 18.50 G	18.40 G
MAX PENDULUM G	29 G MAX	25.19 G
MAX PENDULUM G ABOVE 30 MS	29 G MAX	18.26 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G	34 - 42 MS	35.25 MS
D PLANE	MAX 64 - 78 DEG.	75.10 DEG.
ROTATION	TIME 57 - 64 MS	58.63 MS
MOMENT ABOUT OCCIPITAL	MAX 88.2 - 108.5 NM	94.52 NM
CONDYLE	TIME 47 - 58 MS	48.38 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO	113 - 128 MS	117.38 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO	97 - 107 MS	98.38 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chris Middleton

TRC , 48C9NF1
572E SN48 NECK FLEXION CAL09
93217
PENXG

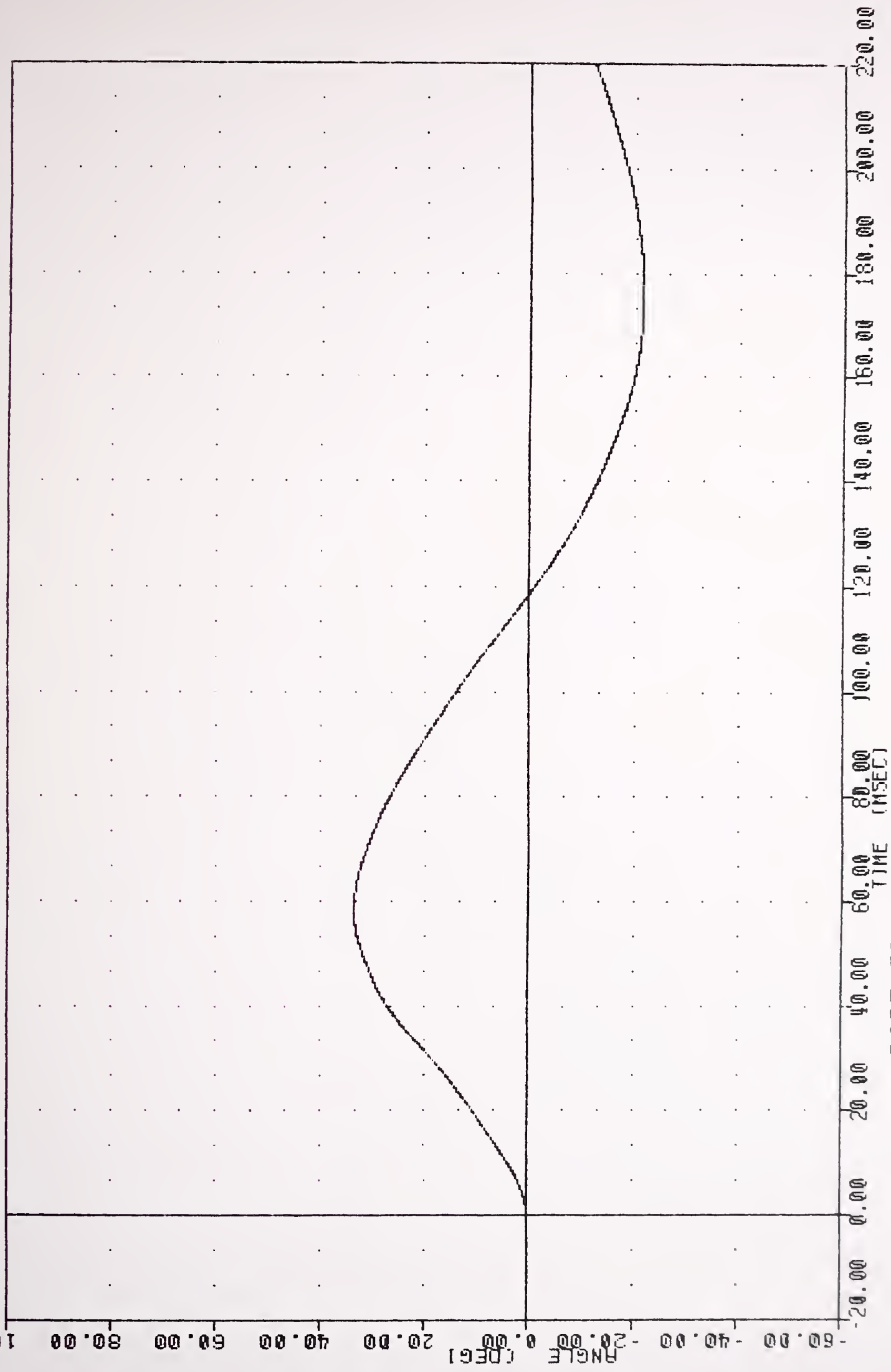
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -3.46e 40.38 , 25.20 e 7.38



PART 572-E HYBRID III NECK FLEXION CALIBRATION
PENDULUM DECELERATION

TAC , 48C9NF1
572E SN48 NECK FLEXION CAL09
93217
BETA

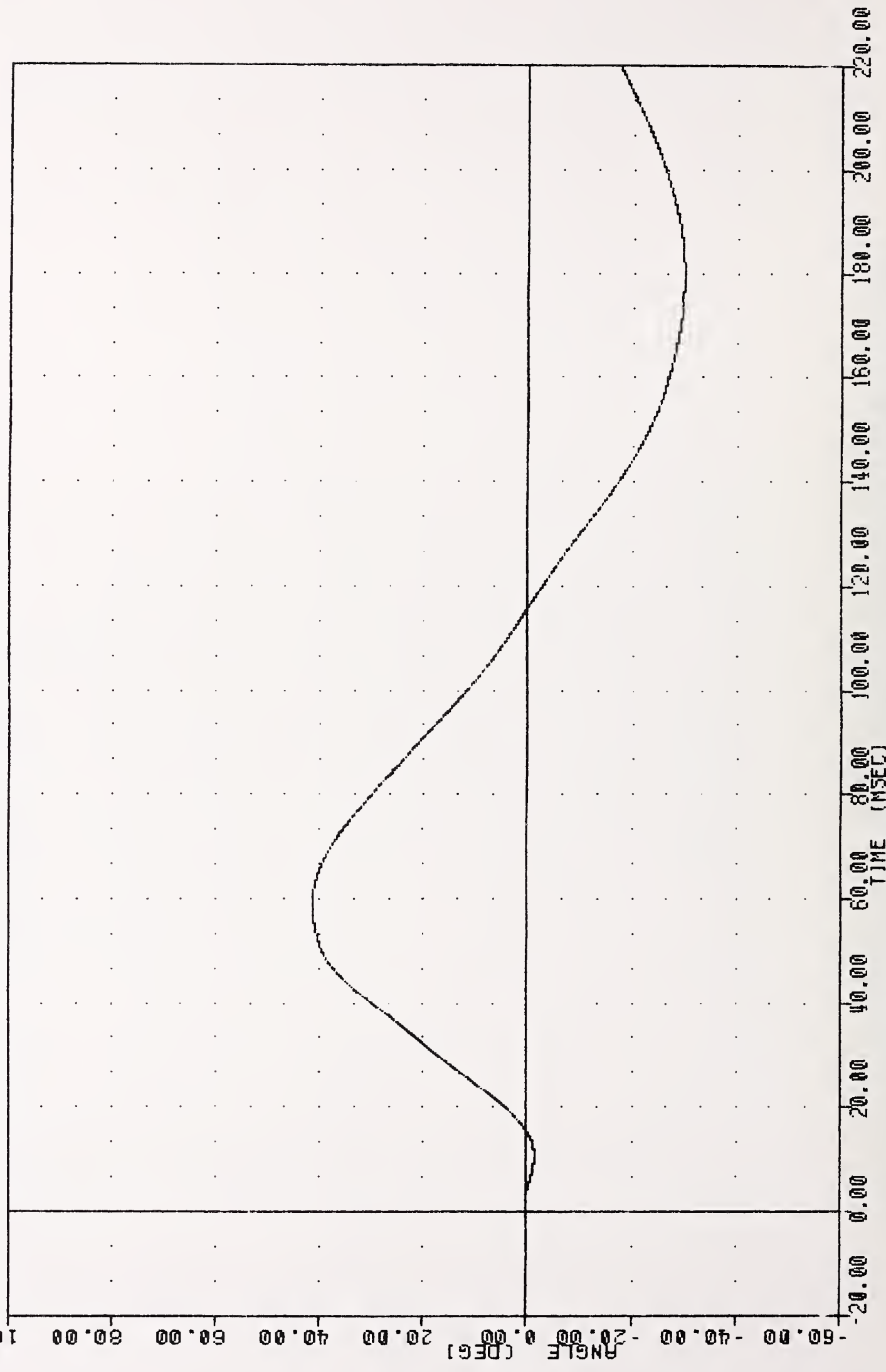
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -21.37 171.50 33.68 58.50



PART 572-E HYBRID III NECK FLEXION CALIBRATION
ROTATION ABOUT BASE OF NECK

TRC , 48C9NF1
 572E SN48 NECK FLEXION CALQ9
 93217
 THETA

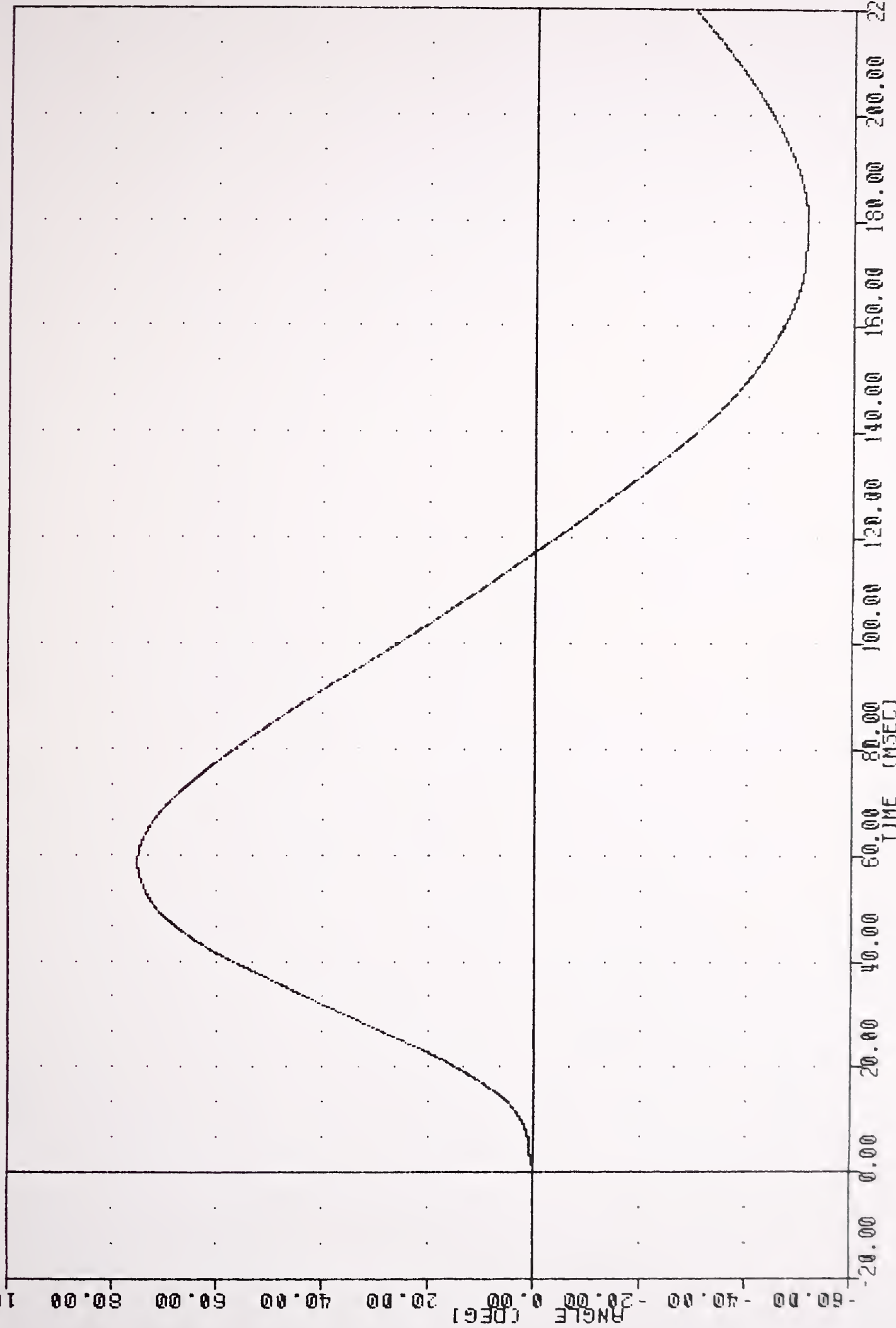
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -29.908 179.38 41.43 58.88



PART 572-E HYBRID III NECK FLEXION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

TRC
572E SN48 NECK FLEXION CAL09
93217
TOTAL

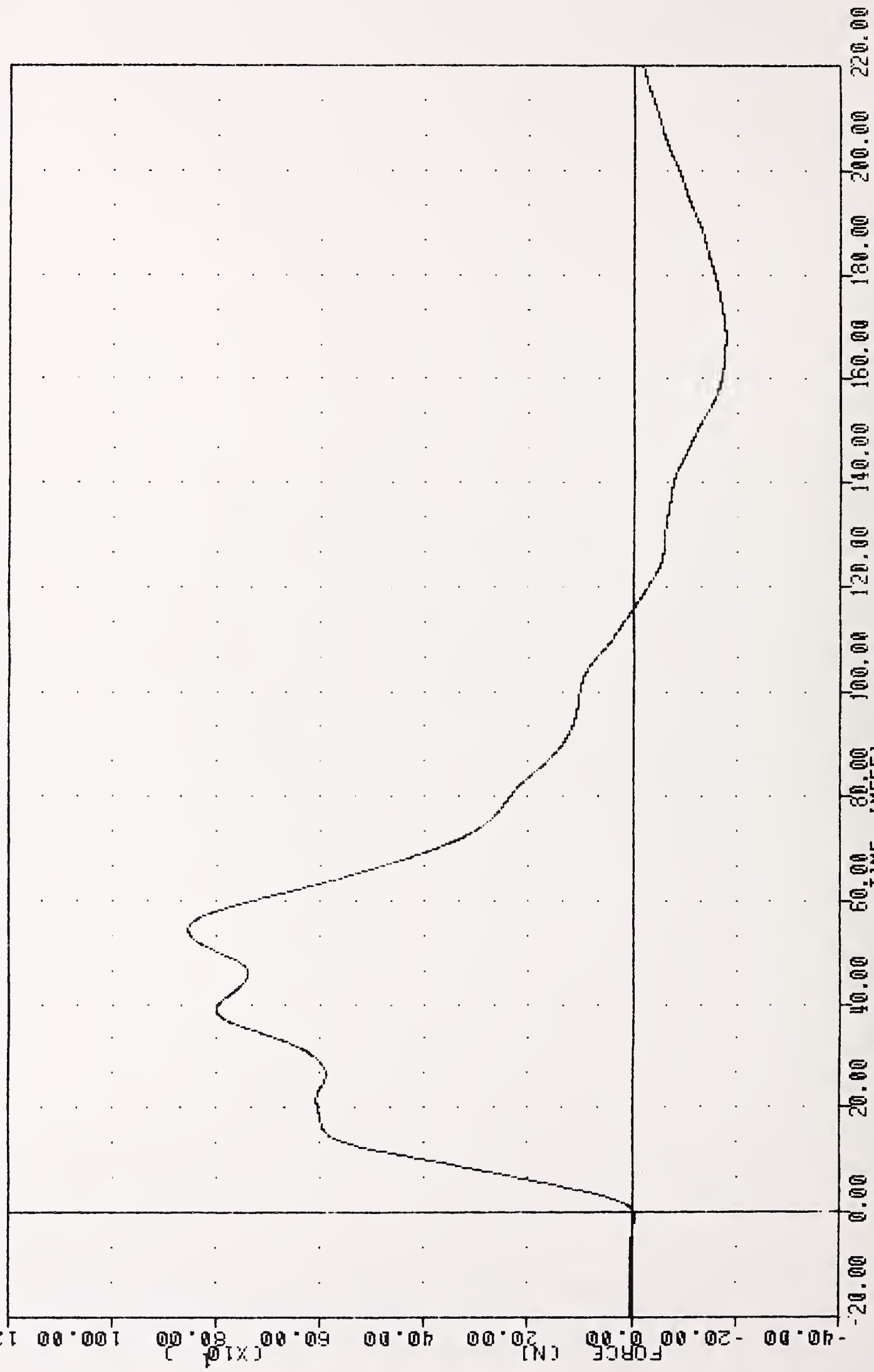
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -51.27° 179.38° 75.10° 58.63



PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL ROTATION

TRC
572E SN40 NECK FLEXION CAL09
93217
NEKXF

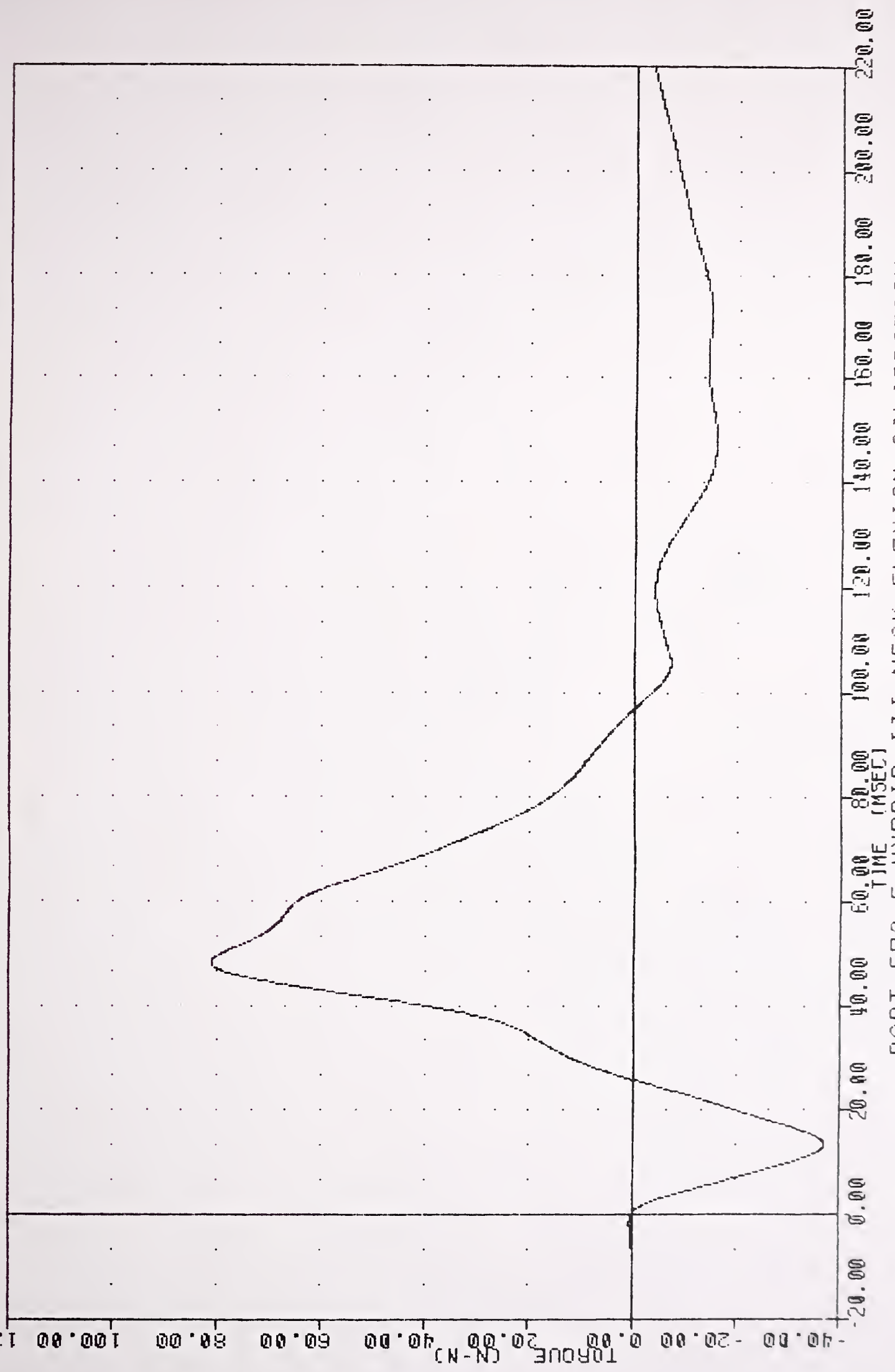
FILTER = BLFP 100/ 317/ -40
MIN, MAX VALUES = -178.38 168.13 853.63 54.38



PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK FORCE X AXIS

TRC
572E SN48 NECK FLEXION CAL09
93217
NEKYM

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -37.21 13.38, 81.04 2 48.25

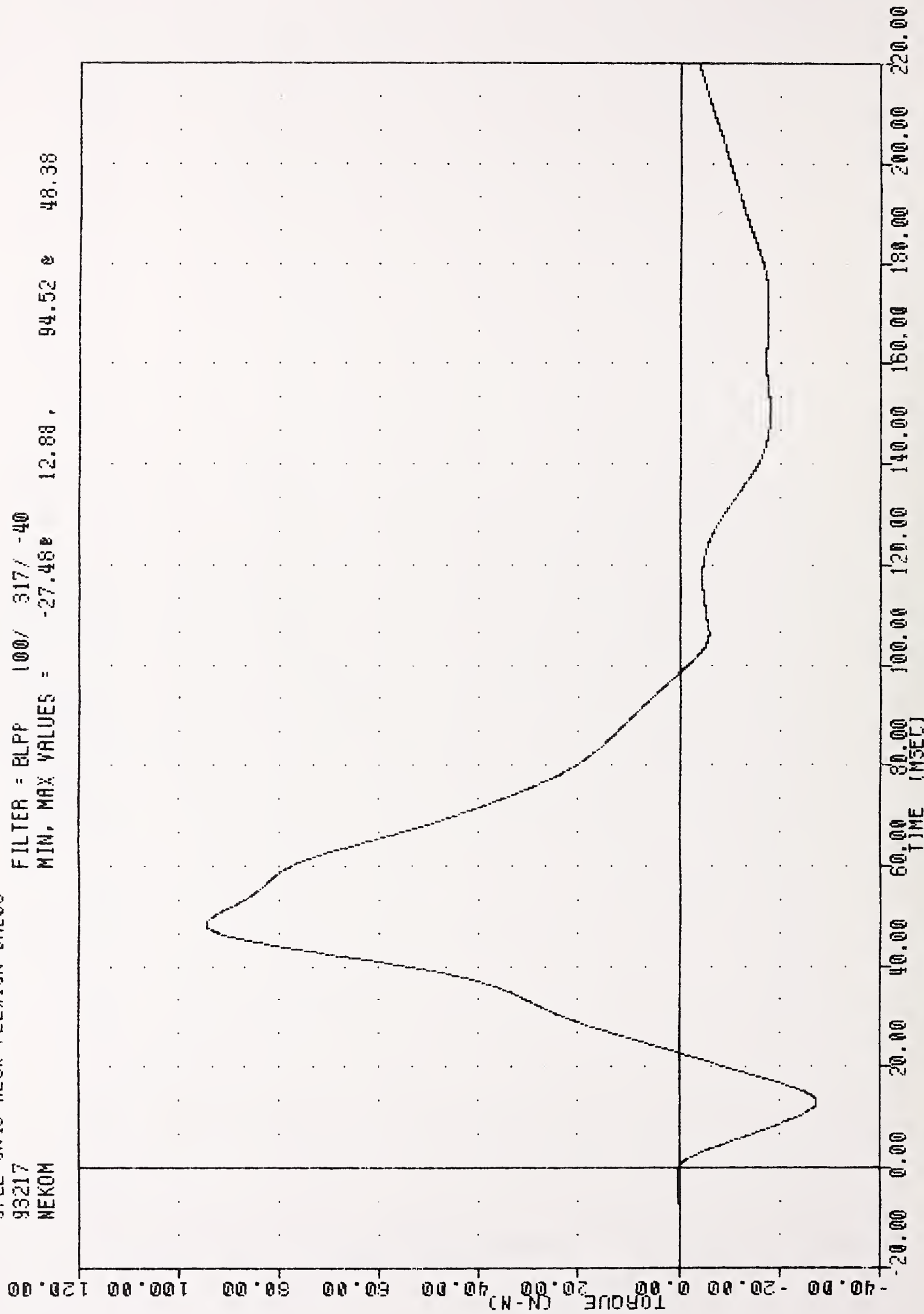


PART 572-E HYBRID III NECK FLEXION CALIBRATION
NECK MOMENT Y AXIS

TRC , 4809NF1
572E 3N40 NECK FLEXION CAL09
93217
NEKOM

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -27.48 12.88

94.52 48.38



PART 572-E HYBRID III NECK FLEXION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER INC.

NECK EXTENSION TEST

HYBRID III

05-AUG-93

6 AXIS NECK TRANSDUCER
TRC 48C9NE1

572E SN48 NECK EXT. CAL 09

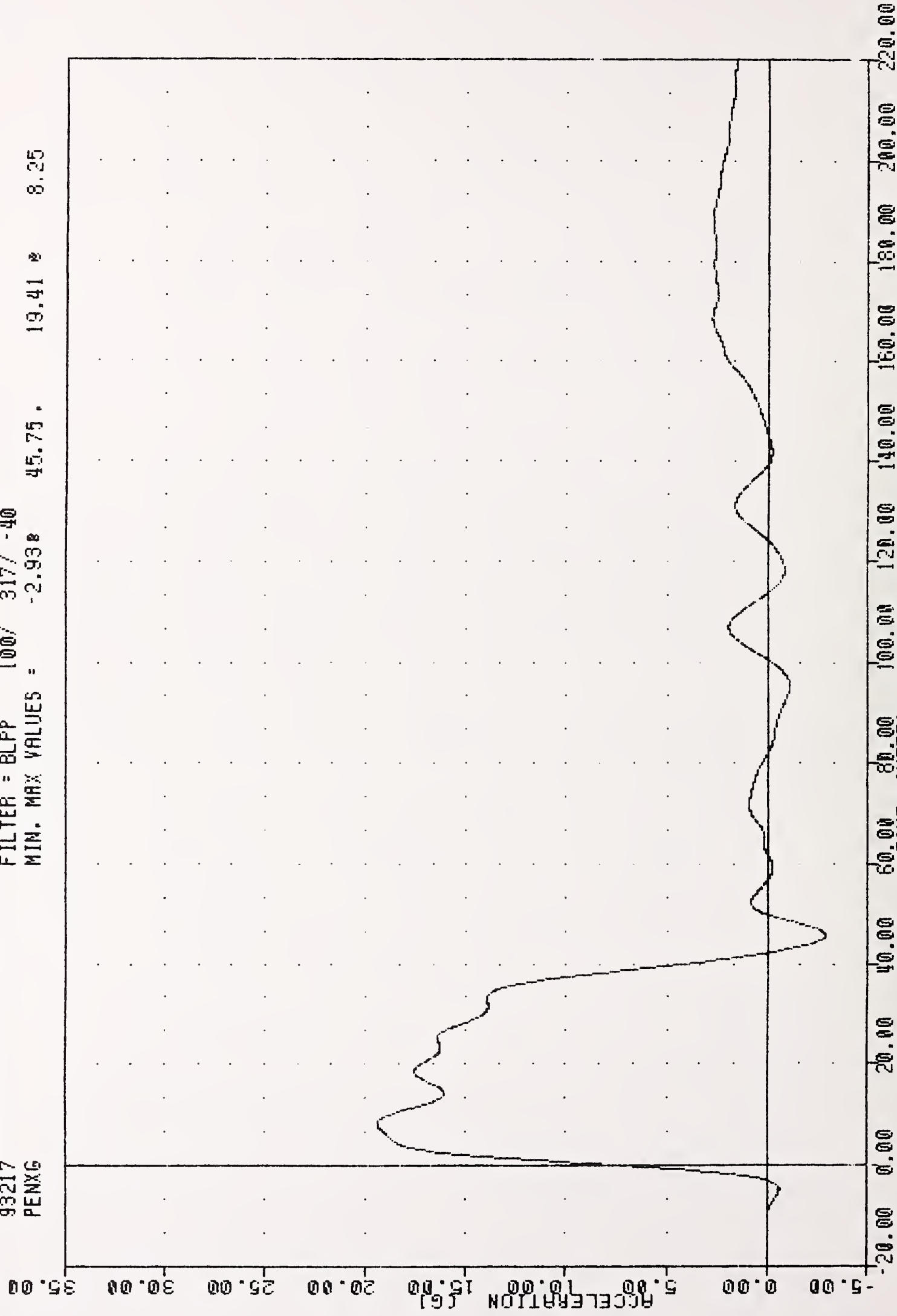
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	50.0 %
IMPACT VELOCITY	5.95 - 6.19 M/SEC	6.00 M/SEC
PENDULUM	10 MS 17.20 - 21.20 G	18.76 G
DECELERATION	20 MS 14.00 - 19.00 G	17.24 G
	30 MS 11.00 - 16.00 G	14.12 G
MAX PENDULUM G	22 G MAX	19.41 G
MAX PENDULUM G ABOVE 30 MS	22 G MAX	14.08 G
DECELERATION-TIME CURVE		
DECAY TIME TO 5 G	38 - 46 MS	39.50 MS
D PLANE	MAX 81 - 106 DEG.	98.86 DEG.
ROTATION	TIME 72 - 82 MS	75.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN -80.0/-52.9 NM	-71.16 NM
ROTATION ANGLE-TIME CURVE		
DECAY TIME TO ZERO	147 - 174 MS	156.50 MS
NEGATIVE MOMENT-TIME CURVE		
DECAY TIME TO ZERO	120 - 148 MS	141.75 MS

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC , 4809NE1
572E 3N40 NECK EXT. CAL09
93217
PENXG

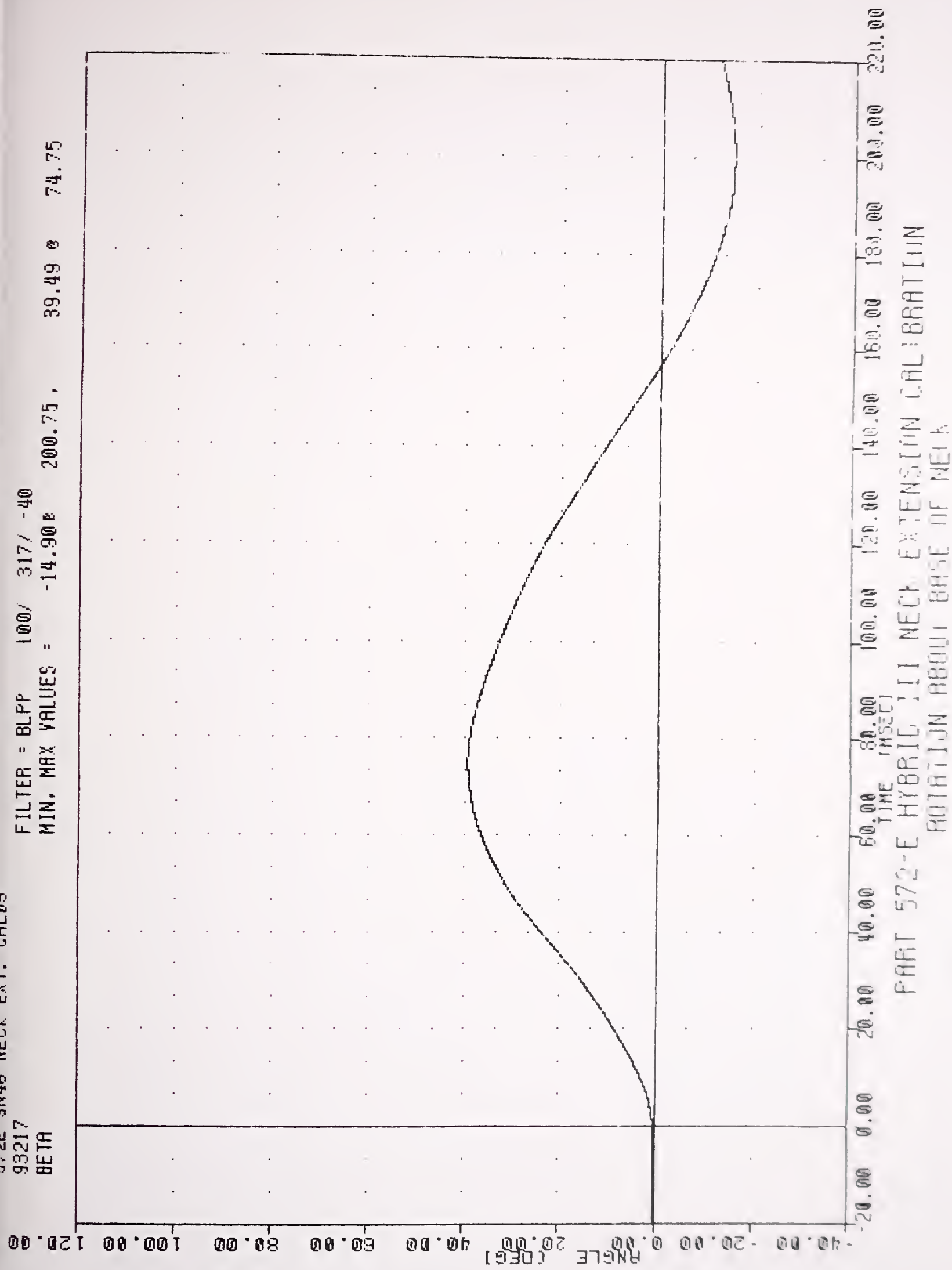
FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -2.938 45.75. 19.41 8.25



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
PENDULUM DECELERATION

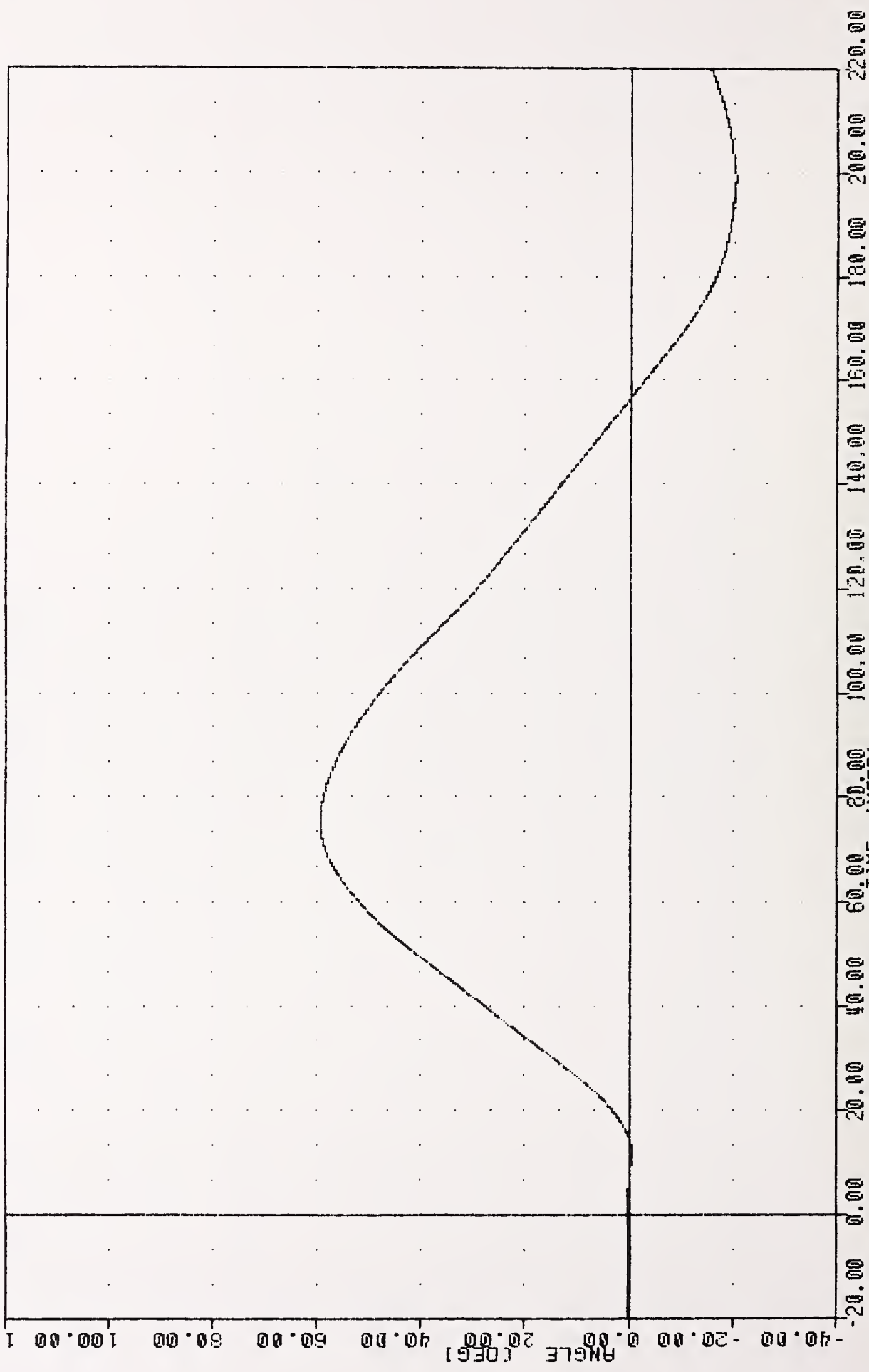
TRC
572E SN48 NECK EXT. CAL09
93217
BETA

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -14.90 200.75, 39.49 74.75



TRC , 4809NEJ
 572E SN40 NECK EXT. CAL09
 93217
 THETA

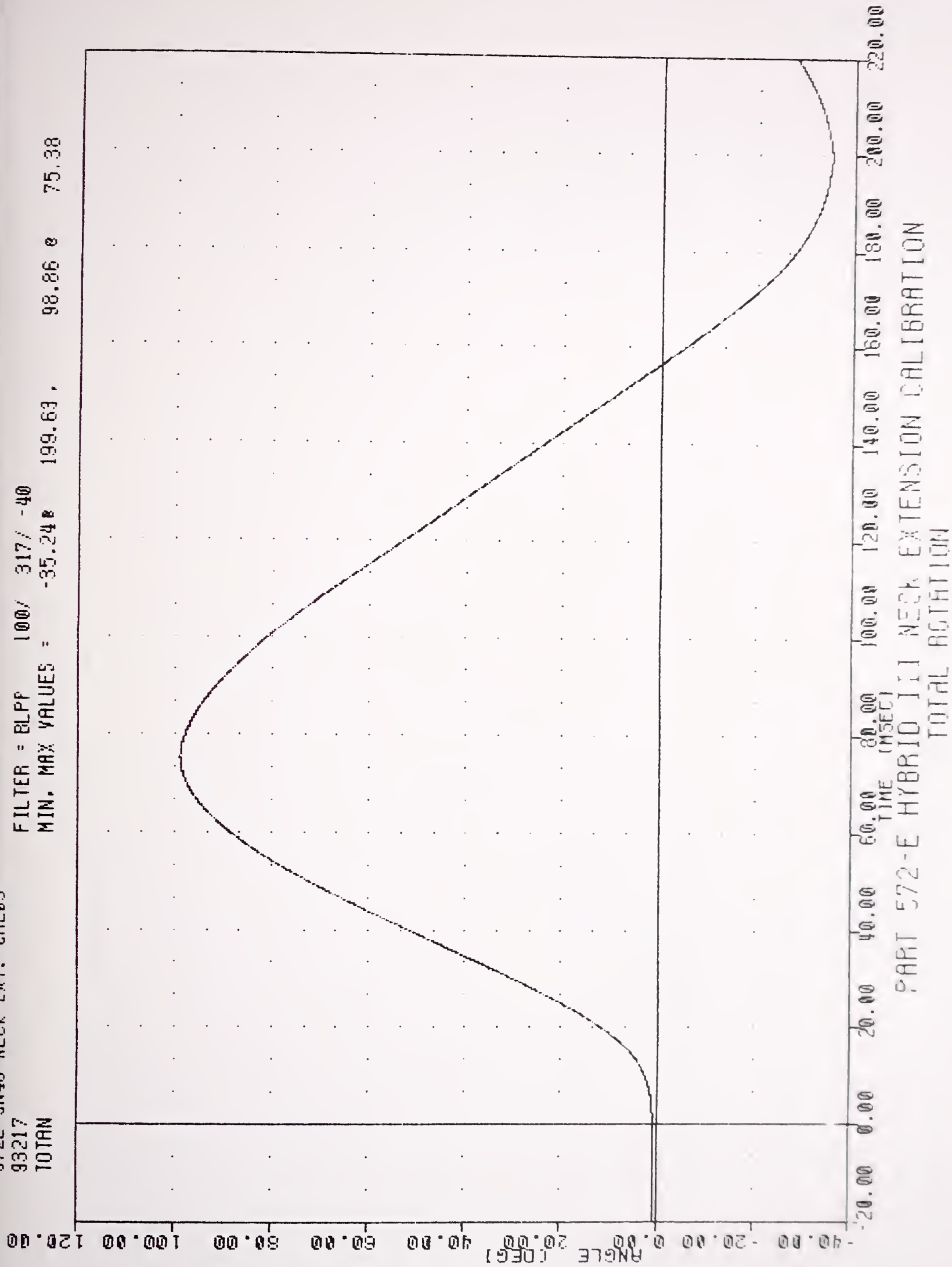
FILTER = BLPP 100/ 317/ -40
 MIN. MAX VALUES = -20.350 199.13 59.37 8 75.63



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
 ROTATION ABOUT OCCIPITAL CONDYLE

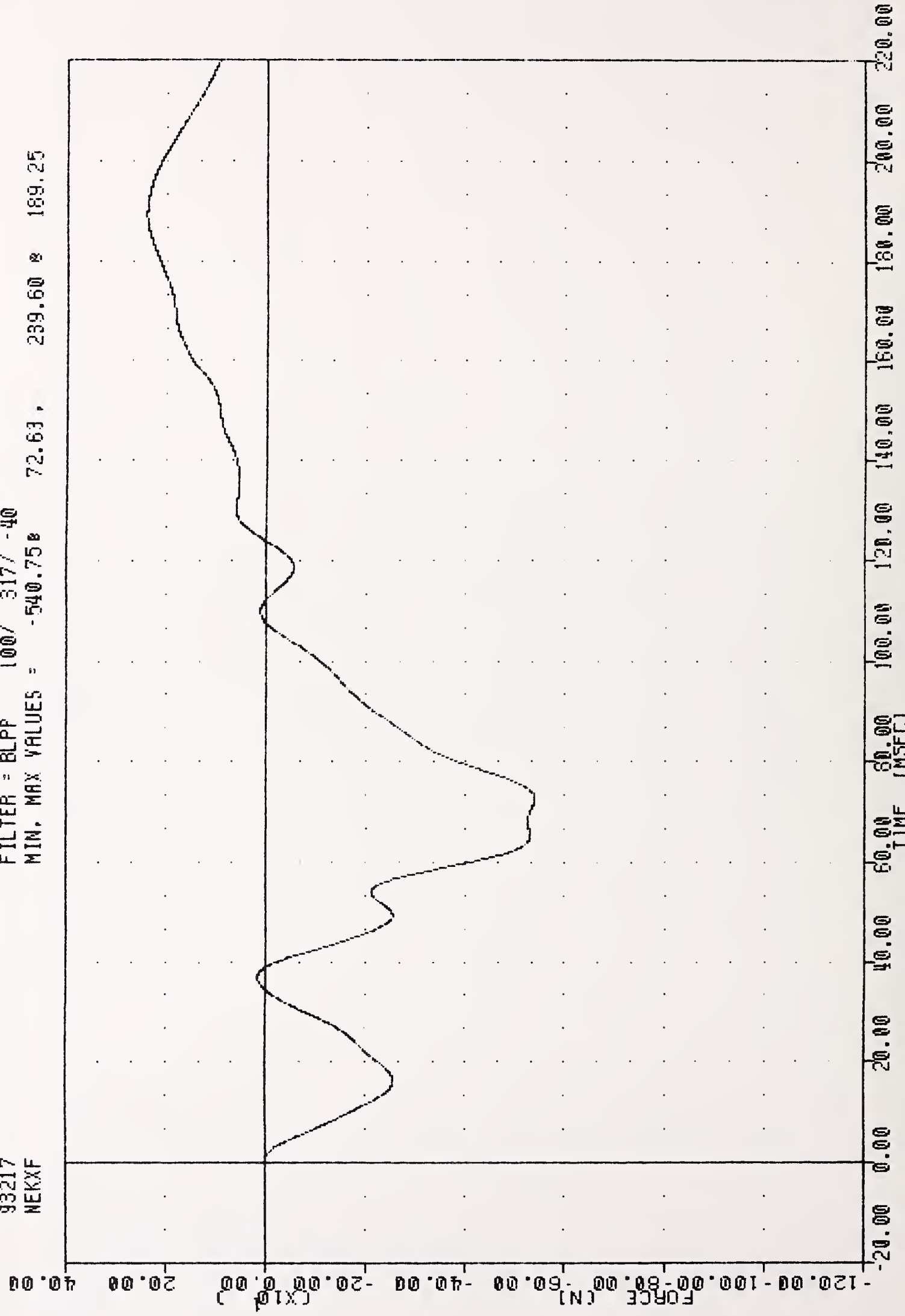
TRC
572E 3N48 NECK EXT. CAL09
93217
TOTAL

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -35.24 199.63 98.86 75.38



TRC . 48C9NE1
572E SN48 NECK EXT. CAL09
93217
NEKXF

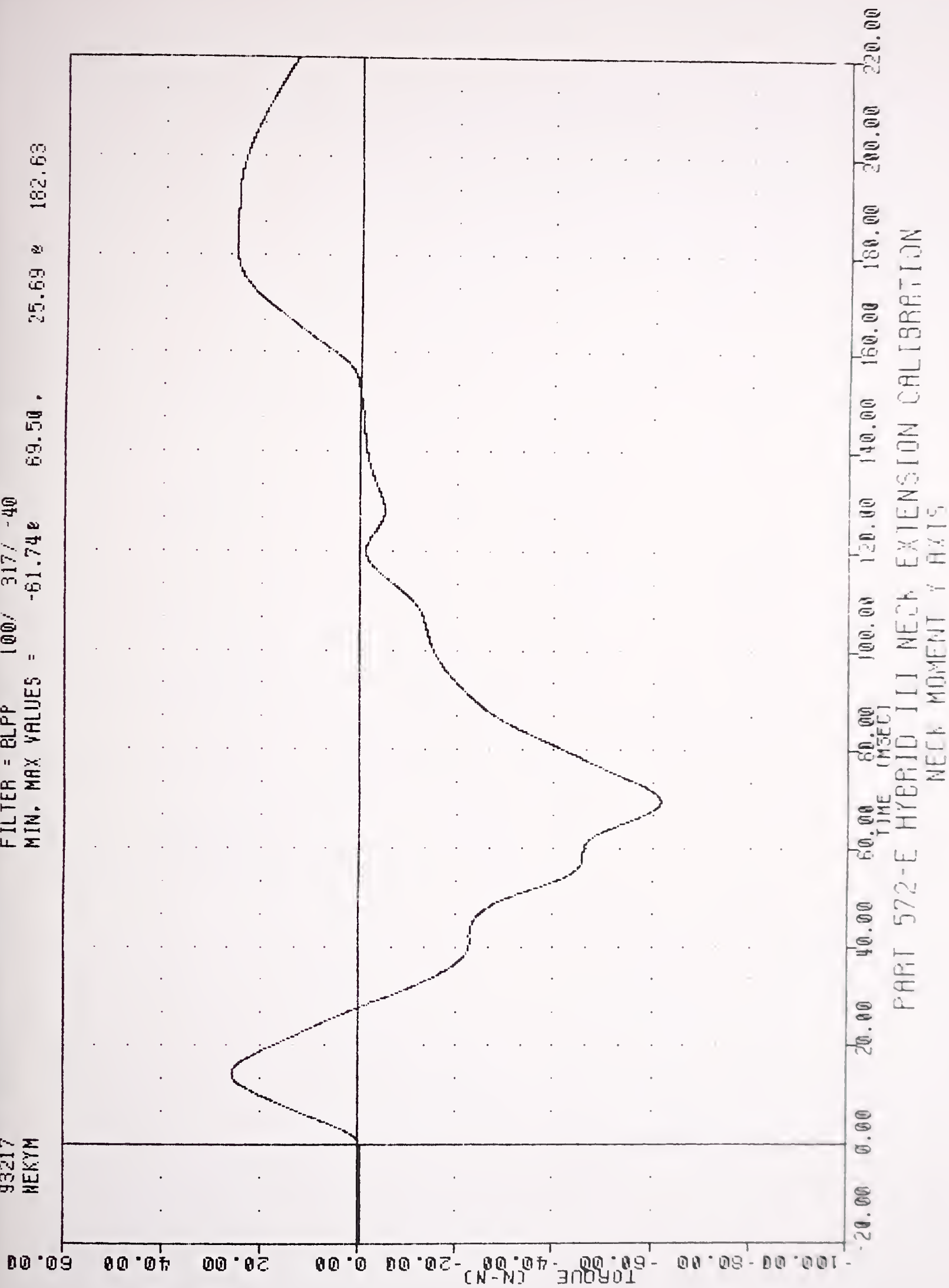
FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -540.75 72.63, 239.60 189.25



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
NECK FORCE X AXIS

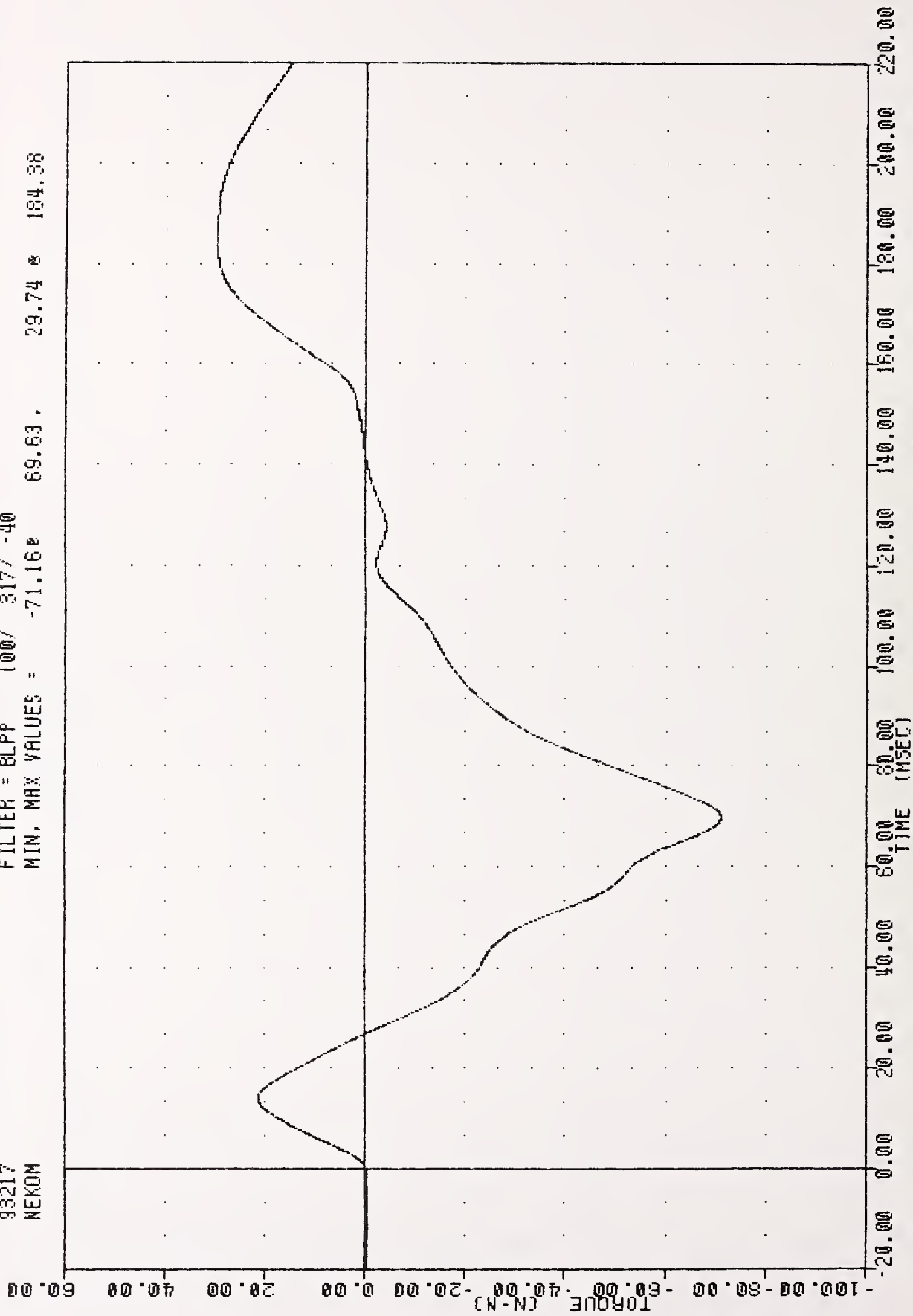
TRC , 48C9NE1
572E SN40 NECK EXT. CAL09
93217
NEKYM

FILTER = BLPP 100/ 317/ -40
MIN. MAX VALUES = -61.74e 69.50 , 25.69 e 182.63



TRC , 4809NE1
572E SN48 NECK EXT. CALD9
93217
NEKOM

FILTER = BLPP 100/ 317/ -40
MIN, MAX VALUES = -71.16 69.63 29.74 184.38



PART 572-E HYBRID III NECK EXTENSION CALIBRATION
TOTAL MOMENT ABOUT OCCIPITAL CONDYLE

TRANSPORTATION RESEARCH CENTER INC.

THORAX IMPACT TEST

HYBRID III

05-AUG-93

TRC

48C9TH1

572E SN98 H.S. THORAX CAL09

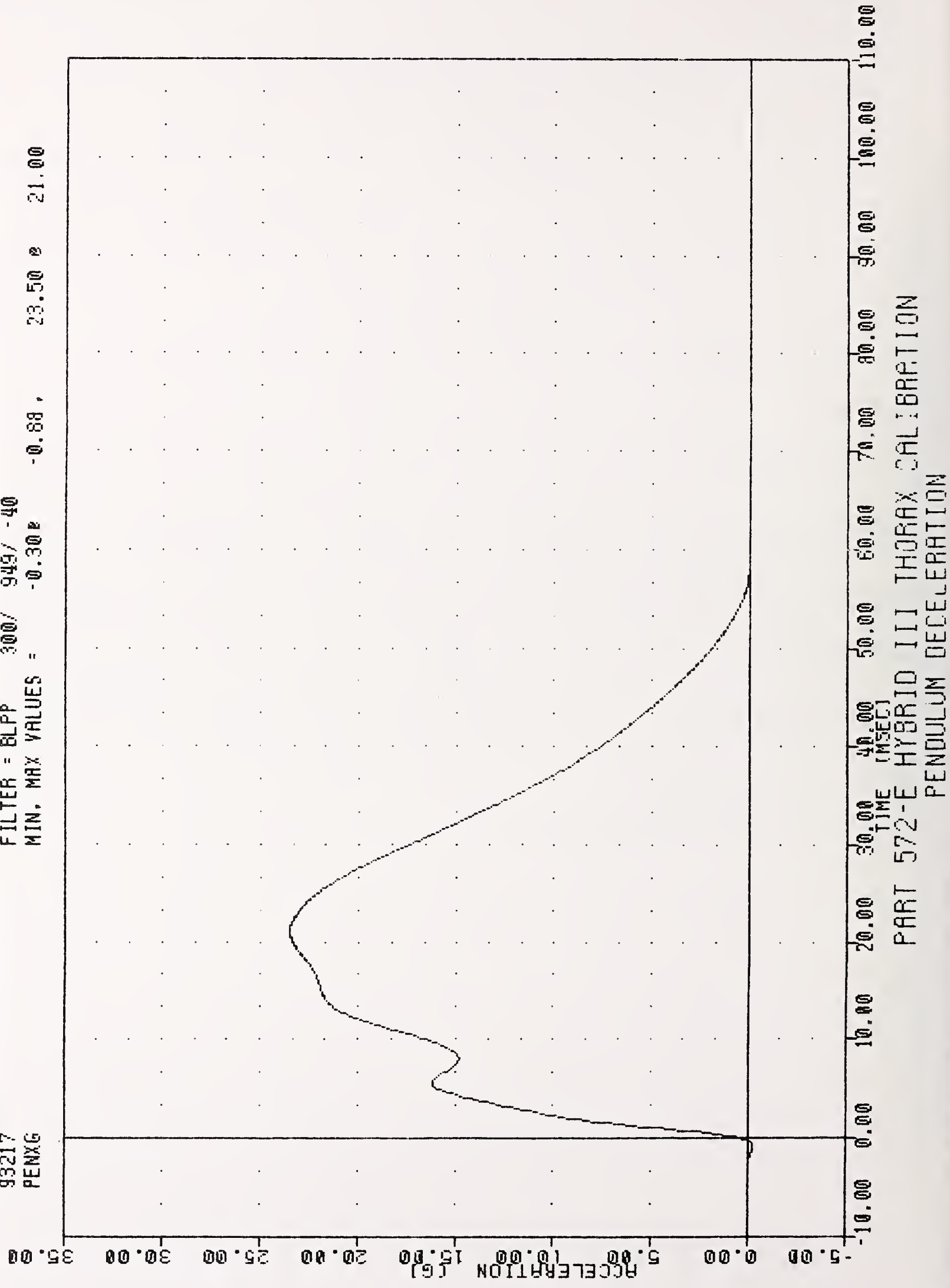
		HIGH SPEED TEST	
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
TEMPERATURE	20.6-22.2 DEG. C	21.1 DEG. C	
RELATIVE HUMIDITY	10% - 70%	50.0 %	
PENDULUM VELOCITY	6.59 - 6.83 M/SEC	6.68 M/SEC	
MAXIMUM DEFLECTION	63.5 - 72.6 MM	72.4 MM	
MAXIMUM RESISTIVE FORCE	5159 - 5894 N	5384. N	
INTERNAL HYSTERESIS	69% - 85%	71.1%	

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC
572E SN48 H.S.THORAX CAL09
93217
PENXG

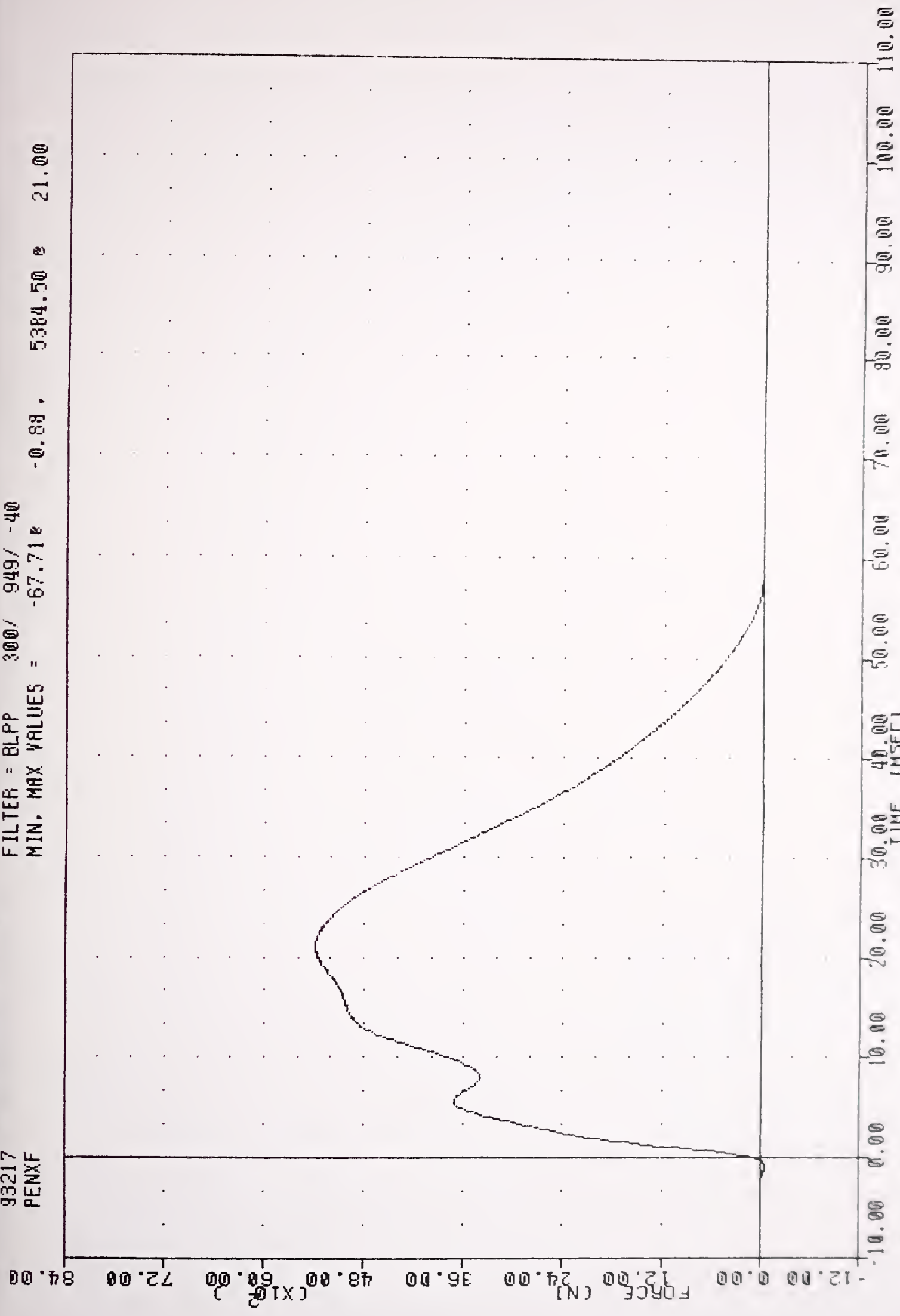
FILTER = BLPP 300/ 949/ -40
MIN. MAX VALUES = -0.30E -0.88, 23.50 E 21.00



PART 572-E HYBRID III THORAX CALIBRATION
PENDULUM DECELERATION

IRC
 572E SN40 H.S. THORAX CAL09
 93217
 PENXF

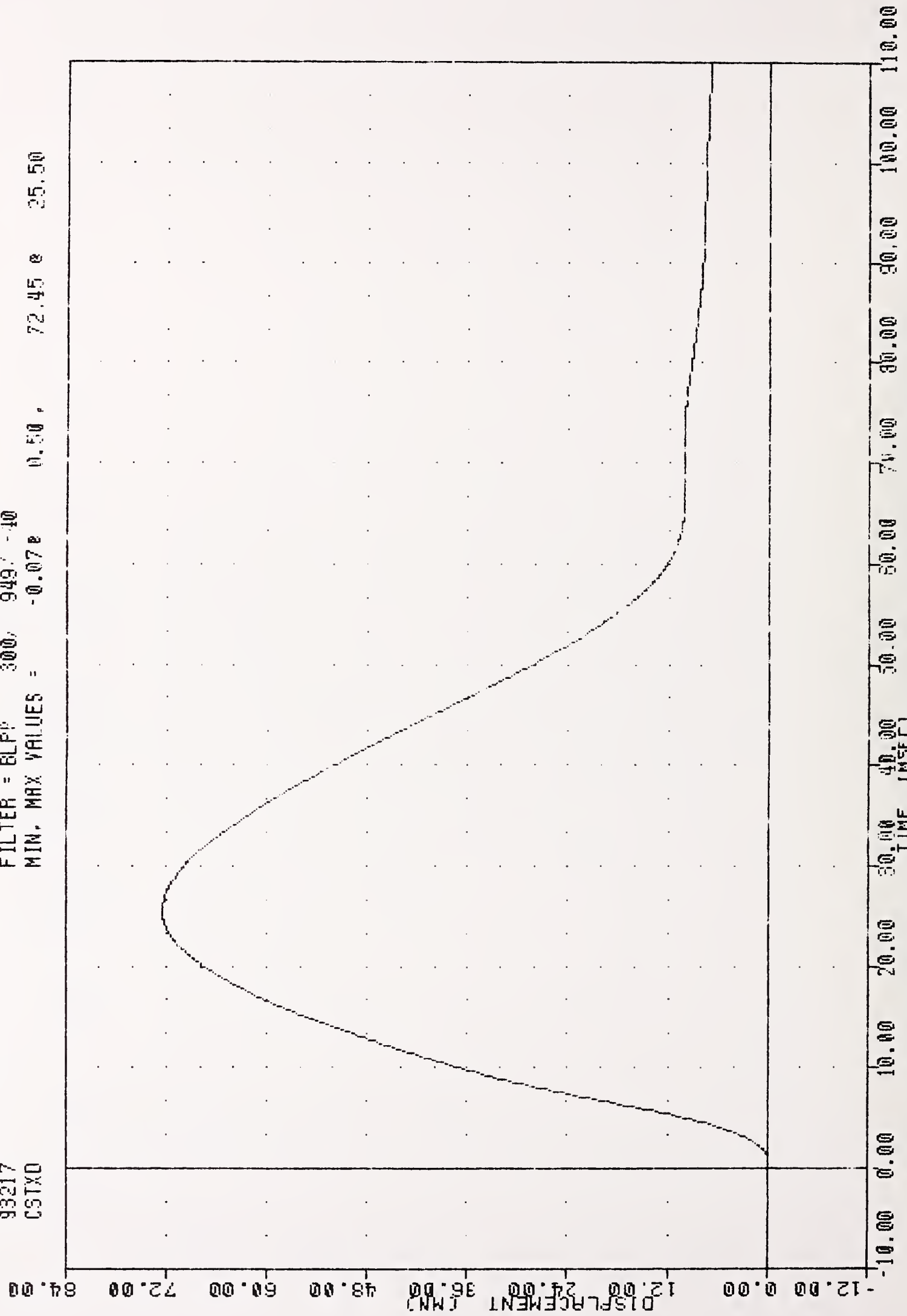
FILTER = BLPP 300/ 949/ -40
 MIN. MAX VALUES = -67.71e -0.88, 5384.50 e 21.00



PART 572-E HYBRID III THORAX CALIBRATION
 PENDULUM FORCE

TRC , 4809TH1
 572E 5N46 H.S. THORAX CALOR
 93217
 CSTXD

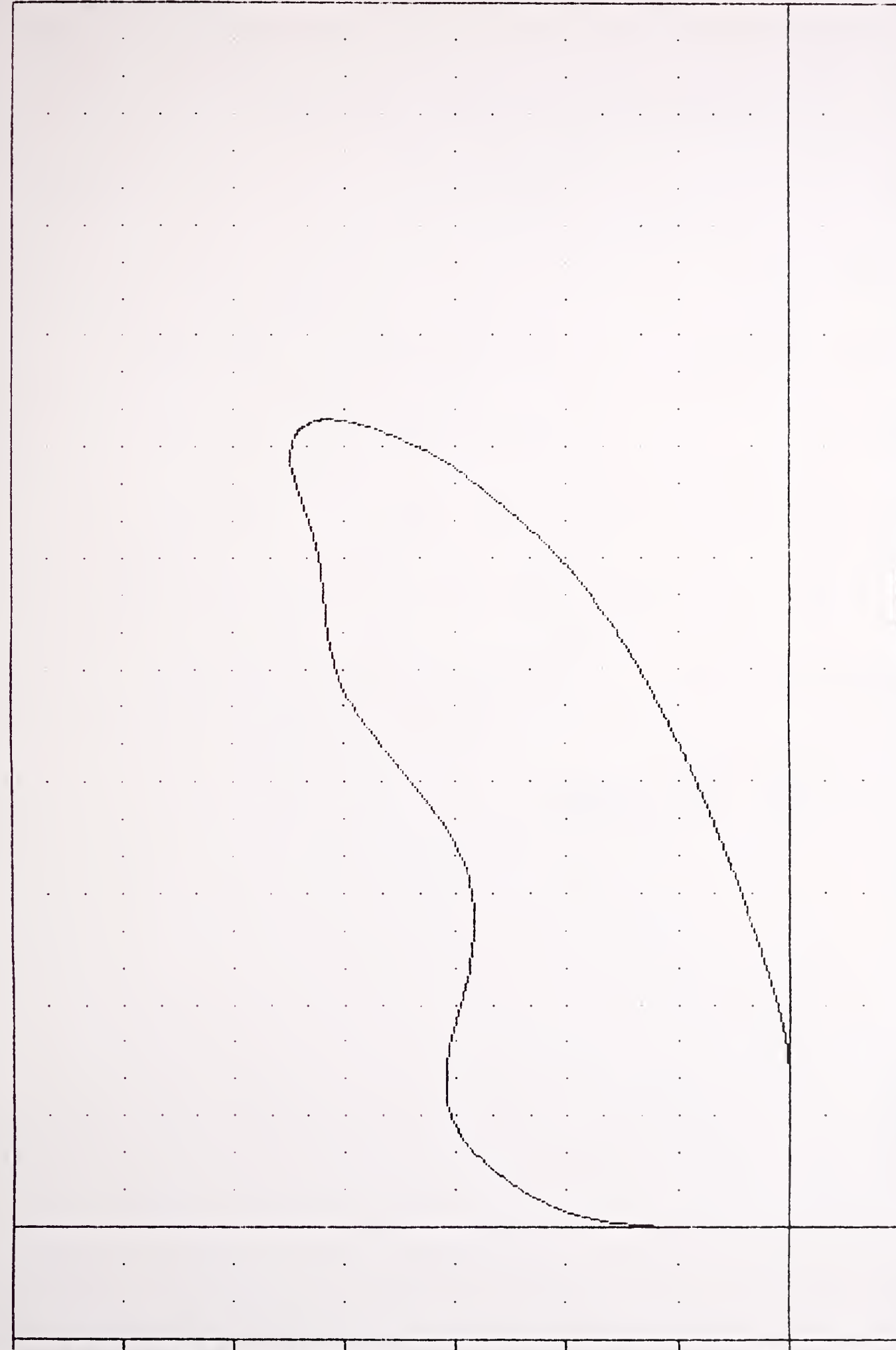
FILTER = BLPP 300, 949, -40
 MIN. MAX VALUES = -0.070 0.50, 72.45 25.50



PART 572-E HYDRIO ICI THORAX CALIBRATION
 STERNUM DISPLACEMENT

TRC
 CSTXD
 PENXF
 '4809TH1
 FILTER = BLPP
 FILTER = BLPP
 572E SN48 H.S. THORAX CAL09
 300/ 949/ -40 MIN. MAX =
 300/ 949/ -40 MIN. MAX =
 93217
 -0.07 e
 -67.71 e
 0.50 ;
 -0.88 ;
 72.45 e
 5384.50 e
 25.50
 21.00

-12.00 0.00 12.00 24.00 36.00 48.00 60.00 72.00 84.00
 (x10²)



-10.00 0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00
 CSTXD
 DISPLACEMENT (MM)
 PART 572-E HYBRID III THORAX CALIBRATION
 CHEST DISPLACEMENT VS PENDULUM FORCE

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

05-AUG-93

RIGHT KNEE
TRC

48C9RK1

572E SN48 RIGHT KNEE CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	4816.4 N
PROBE WEIGHT	5.0 KG	

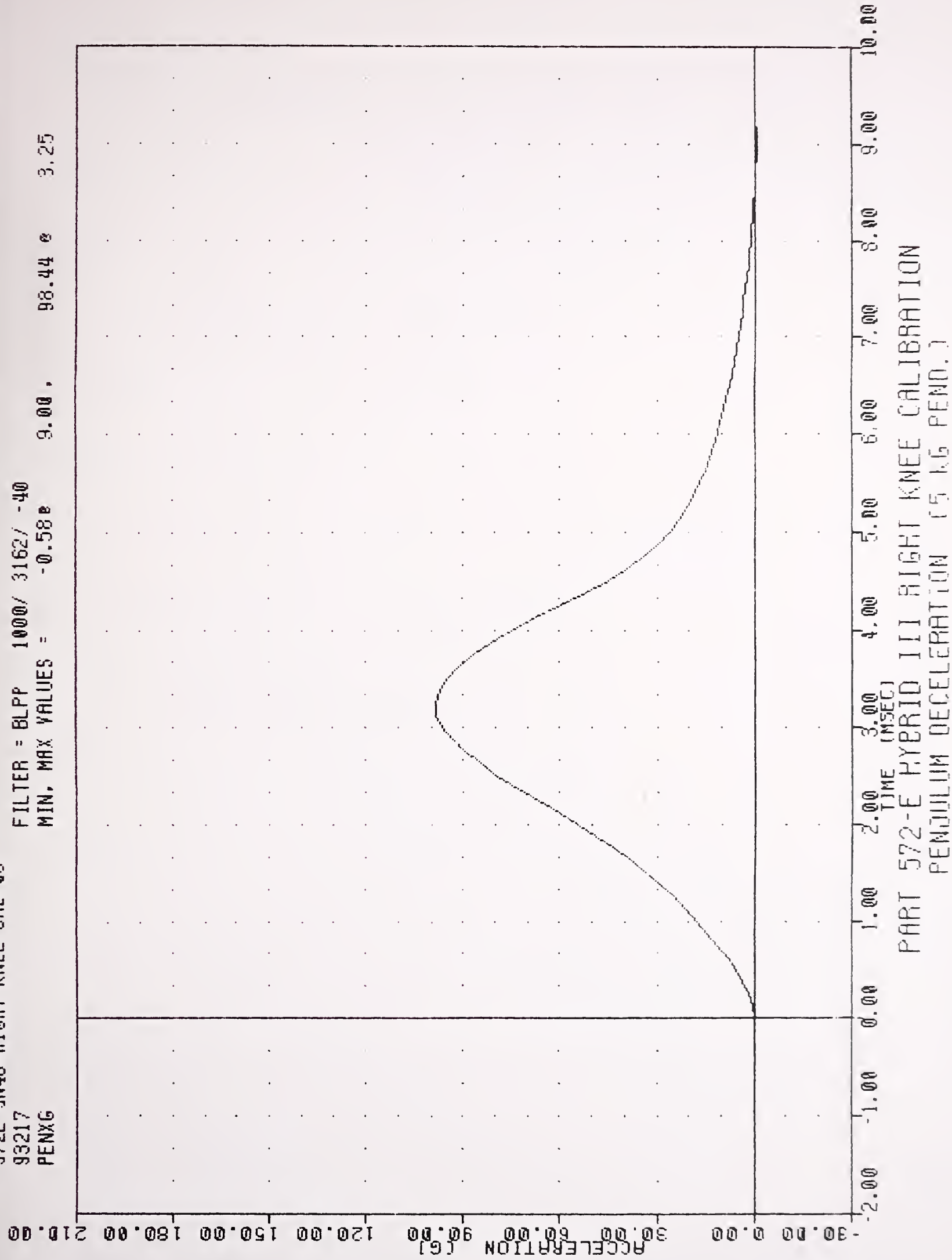
TEST MEETS SPECIFICATIONS

TECHNICIAN *Chas. Middleton*

TRC
572E SN48 RIGHT KNEE CAL 09
93217
PENXG

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.58e

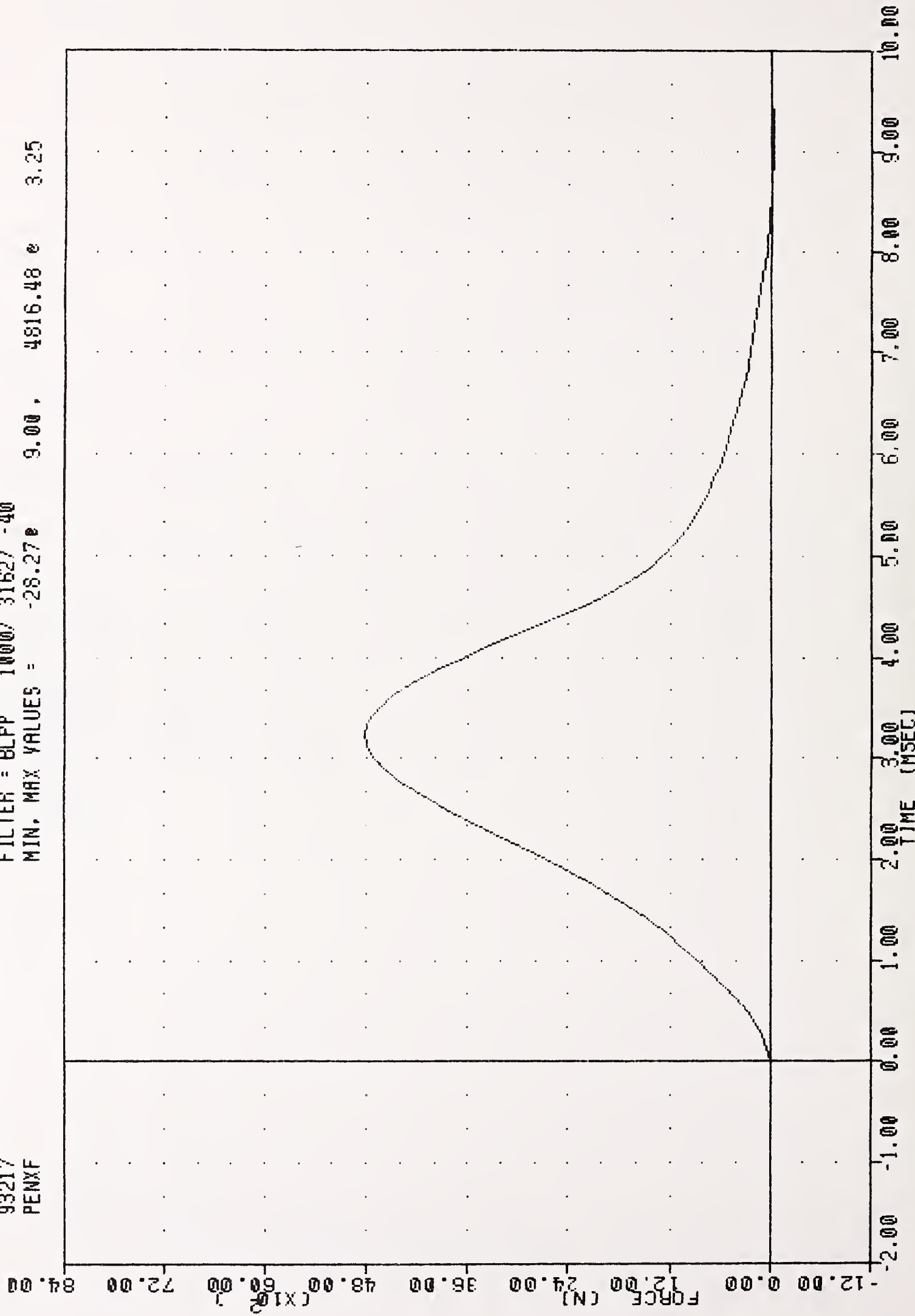
9.00, 98.44 e 3.25



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

IRI
572E SN40 RIGHT KNEE CAL 09
93217
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN. MAX VALUES = -28.27e 9.00, 4816.48 e 3.25



PART 572-E HYBRID III RIGHT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)

TRANSPORTATION RESEARCH CENTER INC.

KNEE IMPACT TEST

HYBRID III

05-AUG-93

LEFT KNEE
TRC

48C9LK1

572E SN48 LEFT KNEE CAL 09

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9-25.6 DEG. C	21.1 DEG. C
RELATIVE HUMIDITY	10% - 70%	50.0 %
PROBE VELOCITY	2.07 - 2.13 M/SEC	2.10 M/SEC
PEAK KNEE IMPACT FORCE	4714 - 5783 N	5436.1 N
PROBE WEIGHT	5.0 KG	

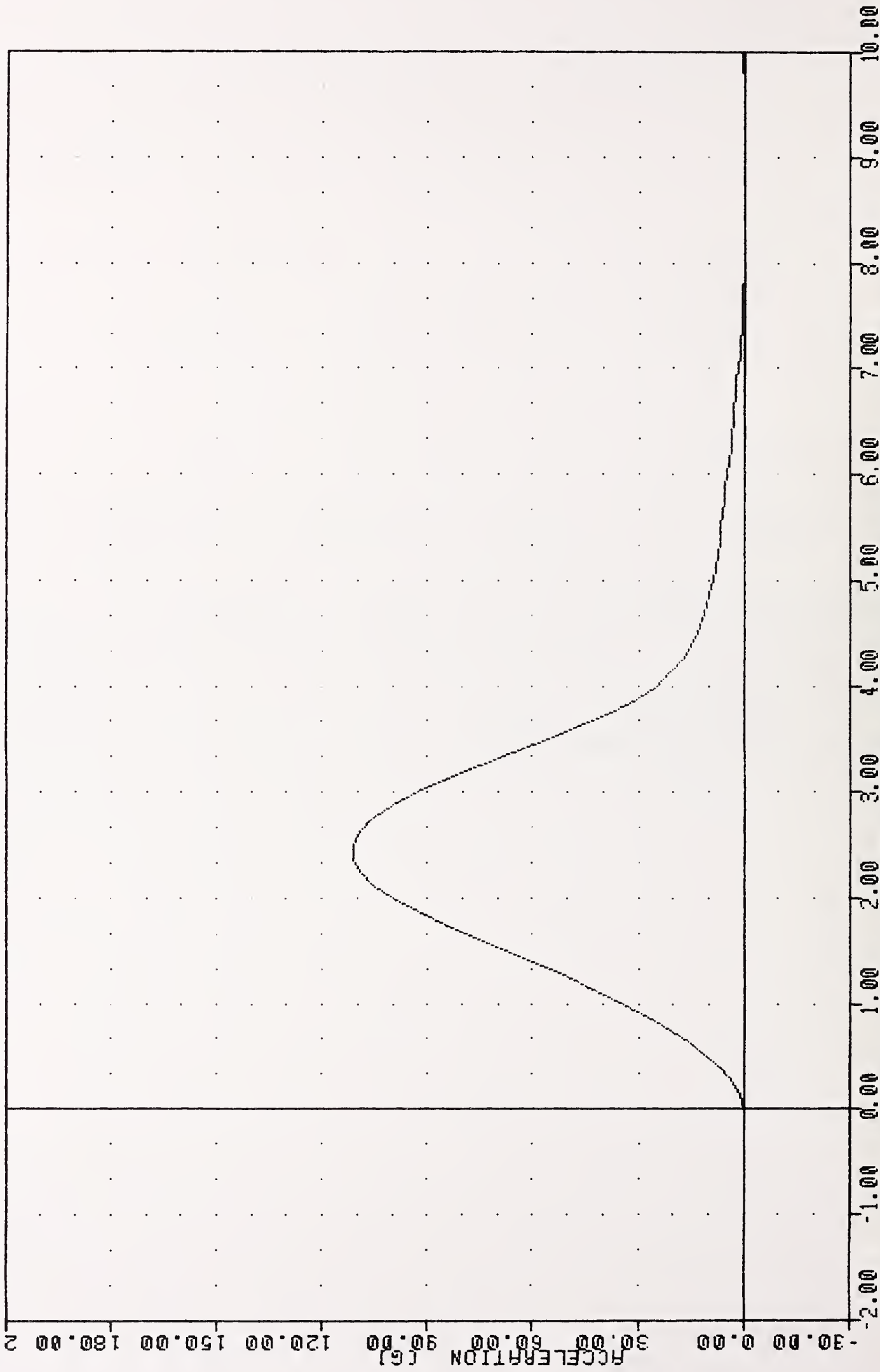
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRC , 48C9LKJ
572E SN48 LEFT KNEE CAL 03
93217
PENXG

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -0.478

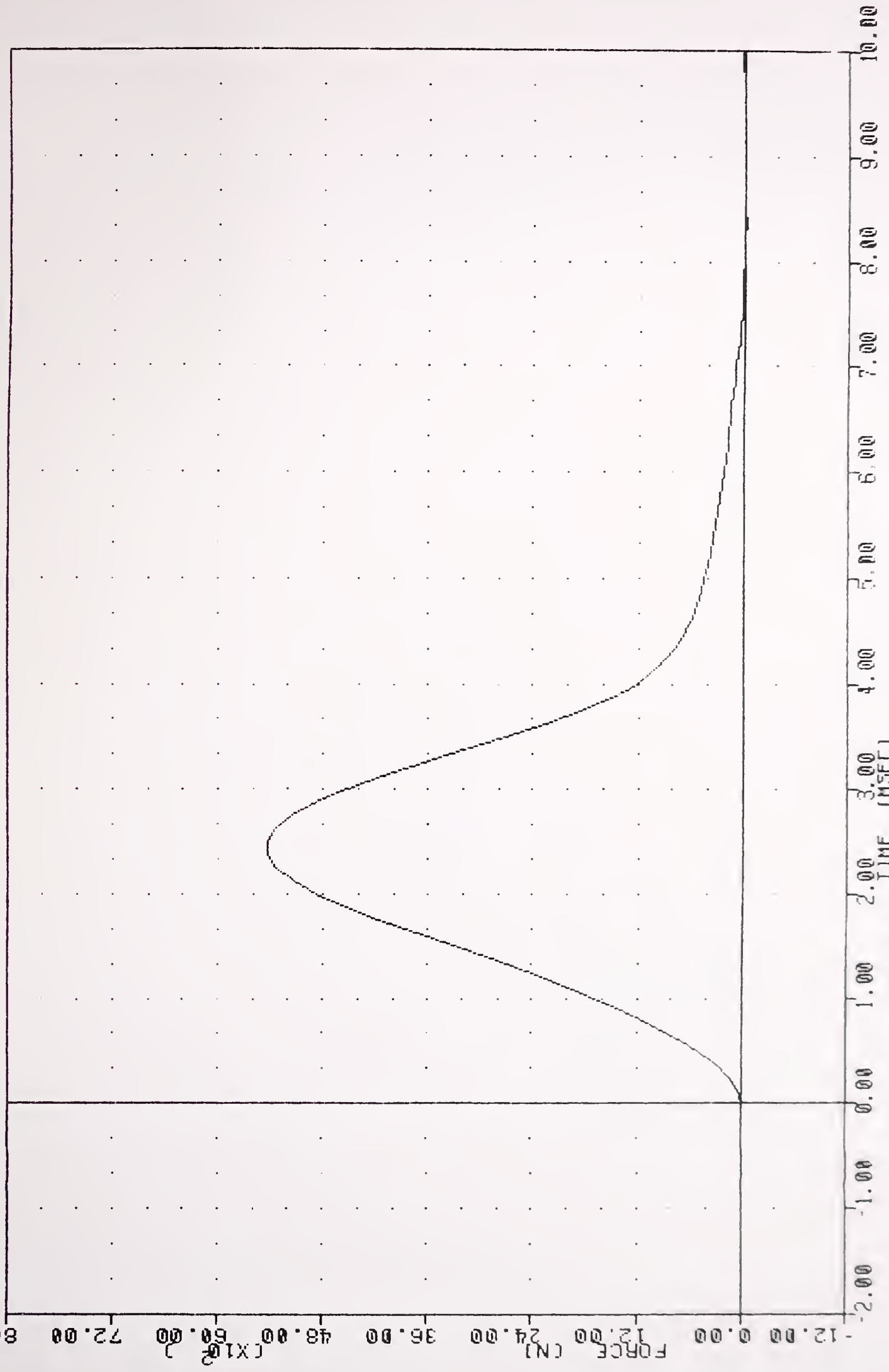
8.38, 111.11 e 2.50



PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM DECELERATION (5 KG PEND.)

TRC
572E SN48 LEFT KNEE CAL 09
93217
PENXF

FILTER = BLPP 1000/ 3162/ -40
MIN, MAX VALUES = -22.82 8.38, 5436.15 2.50



PART 572-E HYBRID III LEFT KNEE CALIBRATION
PENDULUM FORCE (5 KG PEND.)



APPENDIX D

MISCELLANEOUS TEST INFORMATION



DUMMY INSTRUMENTATION PLACEMENT

DUMMY MFR. & S/N: HUMANOID/048

SEATING POSITION: DRIVER

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
HEAD ACCELERATION	X	ENDEVCO	7264	EH78J	REAR
HEAD ACCELERATION	Y	ENDEVCO	7264	DH37J	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	DD17J	UP
NECK FORCE	X	DENTON	1716	0106	*
NECK FORCE	Y	DENTON	1716	0106	*
NECK FORCE	Z	DENTON	1716	0106	*
NECK MOMENT	X	DENTON	1716	0106	*
NECK MOMENT	Y	DENTON	1716	0106	*
NECK MOMENT	Z	DENTON	1716	0106	*
CHEST ACCELERATION	X	ENDEVCO	7264	EH92J	FRONT
CHEST ACCELERATION	Y	ENDEVCO	7264	CC24H	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	FG28J	UP
CHEST DEFLECTION	X	VERNITECH	81422A	9041	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BC75J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	FC43J	LEFT
PELVIS ACCELERATION	Z	ENDEVCO	7264	AP87	UP
LEFT FEMUR FORCE		GSE	2435	726	TENSION
RIGHT FEMUR FORCE		GSE	2430	756	TENSION

*See SIGN CONVENTION sheet for positive sensing orientation of neck load channels.

VEHICLE INSTRUMENTATION INFORMATION

TEST NO. 930810

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
1	LEFT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	2264	AR49	REAR
2	RIGHT REAR SEAT					
	CROSSMEMBER LONGITUDINAL	X	ENDEVCO	2264	GA24	REAR
3	ENGINE TOP LONGITUDINAL	X	ENDEVCO	2264	AB62	REAR
4	ENGINE BOTTOM LONGITUDINAL	X	ENDEVCO	2264	BK12	REAR
5	RIGHT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	2264	AK87	REAR
6	LEFT BRAKE CALIPER					
	LONGITUDINAL	X	ENDEVCO	2264	AH88	REAR
7	INSTRUMENT PANEL CENTER					
	LONGITUDINAL	X	ENDEVCO	2264	AD97	REAR
	LAP BELT OUTBOARD FORCE		LEBOW	3419	674	TENSION
	SHOULDER BELT OUTBOARD FORCE		LEBOW	3419	673	TENSION
8	VEHICLE CENTER OF GRAVITY					
	LONGITUDINAL	X	ENDEVCO	2264	AK21	REAR
	LATERAL	Y	ENDEVCO	2264	AD97	RIGHT
	VERTICAL	Z	ENDEVCO	2264	AR38	UP

HEAVY TRUCK ACCELEROMETER INFORMATION

TEST NO. 930810

NO.	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
9	FRONT FRAME CROSSMEMBER	X	ENDEVCO	7264	CM07	REAR
		Y	ENDEVCO	7264	DR93J	RIGHT
		Z	ENDEVCO	7264	EA03H	UP
10	TRUCK CENTER OF GRAVITY	X	ENDEVCO	7264	CY26H	REAR
		Y	ENDEVCO	7264	CK16H	LEFT

SIGN CONVENTION
NHTSA DATA TAPE REFERENCE GUIDE

ACCELEROMETERS:

+X: FORWARD
+Y: LEFTWARD
+Z: UPWARD

POTENTIOMETERS:

+CHEST LONGITUDINAL DEFLECTION: OUTWARD
+CHEST LATERAL DEFLECTION: LEFTWARD
+SEAT BELT DISPLACEMENT: OUTWARD
+SEAT BELT EXTENSION: ELONGATION
+KNEE SLIDER DISPLACEMENT: DISTANCE BETWEEN FEMUR
AND TIBIA INCREASED
(IN RELATION TO A
SEATED DUMMY)

LOAD CELLS:

+FEMUR FORCE: TENSION
+SEAT BELT FORCE: TENSION
+BARRIER FORCE: TENSION

NECK LOAD CELLS:

+X FORCE: HEAD PUSHED FORWARD
+Y FORCE: HEAD PUSHED LEFTWARD
+Z FORCE: HEAD PULLED UPWARD (TENSION ON NECK)
+X MOMENT: RIGHT EAR ROTATING TOWARD RIGHT SHOULDER
+Y MOMENT: CHIN ROTATING TOWARD CHEST
+Z MOMENT: CHIN ROTATING TOWARD LEFT SHOULDER

TIBIA LOAD CELLS:

+X FORCE: TENSION
+Y FORCE: TENSION
+Z FORCE: TENSION
+X MOMENT: BOTTOM OF TIBIA MOVING LEFTWARD
+Y MOMENT: BOTTOM OF TIBIA MOVING REARWARD

